TCA6000 and TCA6500 Timing Clients

Installation and Configuration Guide

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TCA6000 and TCA6500 Timing Clients Installation and Configuration Guide

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The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at http://www.juniper.net/support/eula.html. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

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Documentation Conventions

Table 1 on page xiii defines the notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service

support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/
- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: http://kb.juniper.net/InfoCenter/
- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://tools.juniper.net/SerialNumberEntitlementSearch/

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at http://www.juniper.net/cm/.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see http://www.juniper.net/support/requesting-support.html.

PART 1

TCA6000 and TCA6500 Timing Client Overview

CHAPTER 1

TCA6000 and TCA6500 Timing Client Description

TCA6000 and TCA6500 Timing Client Description

The TCA6000 and TCA6500 Timing Clients are carrier-class, compact network timing clients that deliver multiple outputs in a cost-efficient, flexible platform. This user manual provides installation and operational information for these Timing Clients to allow successful deployment and operation of the server.

The Timing Clients—designed as network edge timing devices—accurately distribute ITU Stratum timing over IP or MPLS networks when attached to a Stratum 1 reference source, such as the TCA8000 or TCA8500 Timing Servers. When referenced to an accurate timing source, multiple output signals are available in the following formats: T1/E1, Pulse-per-Second (PPS), Pulses per Minute (PPM), PPS2 and 10/5/1 MHz. The TCA6500 Timing Client is also designed to accept a GPS signal from a variety of manufacturers' antennas.

NOTE: **The TCA6000 and TCA6500 Timing Clients ship with both T1 and E1 software images installed in the two internal non-volatile memory partitions. By default, the TCA6000 and TCA6500 Timing Clients use the E1 interface type. This manual refers to E1 configuration, alarms, and status but is also applicable to T1 except for some differences in nomenclature that are specific to each frame type. See "Upgrading the TCA6000 and TCA6500 Software" on page 51 to install the software image for the appropriate interface type for the system.**

TCA6000 and TCA6500 Chassis Overview

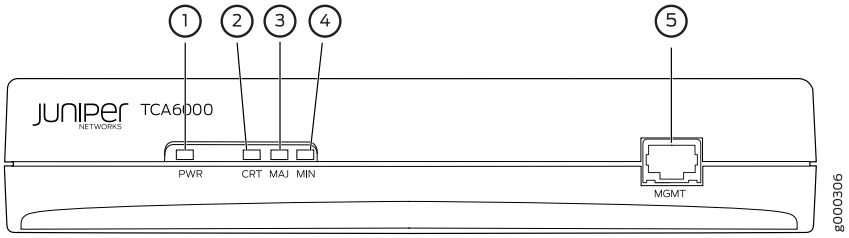
The chassis of both TCA6000 and TCA6500 Timing Clients look similar, only their internal function is different.

The front panel of the Timing Client contains the following components as shown in Figure 1 on page 4:

- 1–Power LED
- 2–Critical alarm LED
- 3–Major alarm LED
- 4–Minor alarm LED
- 5–Craft port

The craft port is used to change the default IP address of the Timing Client. The LEDs display the power status and alarm status of the Timing Client.

Figure 1: TCA6000 and TCA6500 Timing Client, Front View



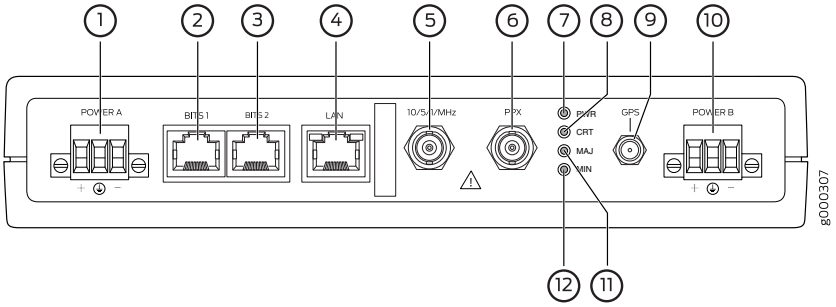
The rear panel of the Timing Client contains the following components as shown in Figure 2 on page 5:

- 1–DC power terminal A
- 2–Building Integrated Timing Supply (BITS) port 1
- 3–BITS port 2
- 4–LAN port
- 5–1/5/10 MHz timing output port
- 6–PPx timing output port
- 7–Power LED
- 8–Critical alarm LED
- 9–GPS antenna port
- 10–DC power terminal B
- 11–Major alarm LED
- 12–Minor alarm LED

A pair of DC terminals each with positive, negative, and ground terminals is used to connect a DC power source to the Timing Client. The LAN port is an RJ45 connector with synch and activity LEDs, which can be used to connect the Timing Client to a PC for managing the Timing Client through an Internet browser. The GPS antenna port is used to connect the Timing Client with an appropriate GPS L1 antenna that receives a minimum GPS signal from a Timing Server. Two BITS ports are used to receive input from BITS

clock sources. Timing output ports are used to deliver 1/5/10 MHz output signal and PPx output signal. The PPx output signal can be PPS, PPM, PPS2, or Pulse-Position Hopping (PPH). The rear LEDs mirror the front LEDs and provides the power status and alarm status of the Timing Client.

Figure 2: TCA6000 and TCA6500 Timing Client, Rear View



PART 2

Installing and Setting Up a TCA6000 or TCA6500 Timing Client

CHAPTER 2

Installing and Setting Up a TCA6000 or TCA6500 Timing Client

This chapter describes the procedure to correctly install the Juniper Networks TCA6000 and TCA6500 Timing Clients. Installation is the same for both models, except that the TCA6500 includes an optional antenna (GPS).

Unpacking the TCA6000 or TCA6500 Timing Client

The Timing Client is shipped with the following items to ensure an optimum installation:

- TCA6000 or TCA6500 Timing Client

Requirements for Installing a TCA6500 Timing Client

Table 2 on page 10 lists the items needed to install the TCA6500 Timing Client.

You must use an appropriate GPS L1 antenna (1575.42 MHz) to receive a minimum GPS signal from the Timing Server. The antenna must allow a minimum signal input level of 20 dB with respect to the antenna output for the Timing Server.

NOTE: To calculate whether the external antenna, cable type, and length meets the minimum TCA GPS antenna input, use the following formula:

TCA GPS signal input = *antenna gain* – [(*cable length*) * (*cable loss* / Meter or Feet)]

Table 2: Antenna Mounting Requirements

Customer Supplied
• GPS L1 antenna with a frequency band of 1575.42 +/-10 MHz 3 dB bandwidth. • Antenna mount • Mounting area clear for at least two meters of any metal or other material that could act as a shield and block the GPS signal • 160 degree clear view of the sky • Clamps, cable ties, and so on, to secure cable

Reserving an IP Address for the TCA6000 or TCA6500 Timing Client

The TCA6000 and TCA6500 Timing Clients support both dynamic and static IP addressing. If a static address is required, an IP address must be reserved and assigned for the Timing Client by a network administrator. The DHCP server will always assign a unique address.

Installing the TCA6000 or TCA6500 Timing Client

CAUTION:

- Ground cable—Make a ground cable using 8-gauge wire with the supplied ground lug. This should attach to your building's earth ground infrastructure.
- Power— Route power connection using 18-22 gauge wire to a 48-volt power distribution frame (fuse position) or fused breaker.

Recommended Mounting Guidelines for the Antenna (TCA6500 Timing Client)

This section describes recommendations for mounting the TCA6500 antenna at a location where the antenna will have GPS satellite visibility. A site survey is highly recommended before any installation. This will determine the best method and location for mounting the antenna. A site survey will also identify additional information such as cable lengths and required mounting materials in order to perform a secure, safe, and reliable installation.

- Optimal GPS Antenna Mounting Conditions on page 11
- Minimal TCA6500 Timing Client Installation Conditions on page 11
- Mounting the Optional Antenna on page 11

Optimal GPS Antenna Mounting Conditions

Ideally, the GPS antenna should be mounted where a 160º clear view of the sky (a 10º angle from horizontal) is available to enable a connection to visible GPS satellites. The ideal mounting location is a roof, tower or an antenna mast, high above any obstruction or any device that may cause signal interference. We recommend a location that has the following characteristics:

- Clear view of the sky in all directions—at least 270º
- Away from high-power transmitters and radar antennas
- At least 3 meters away and at least 1 meter below the highest point of a lightning rod
- Convenient path for running the outdoor coax cable from the GPS antenna to the network

Minimal TCA6500 Timing Client Installation Conditions

The TCA6500 Timing Client can still maintain accurate time when an antenna is mounted in a location that has limited visibility of GPS satellites; however, it is recommended that any obstructions should be minimized. Limitations to satellite visibility for an antenna include overhanging foliage or tall structures. Such structures can block the GPS signal from the antenna and cause gaps in the GPS satellite signal reception. In locations where satellite visibility is limited, consider the following:

- Position the GPS antenna on the side of the structure with good south-facing visibility where more satellites are visible. For example, if you are in the northern hemisphere, place the unit on the southern side of the structure unless that view is restricted or blocked. If that view is restricted or blocked, place the unit on the east or west side of the structure. Avoid the polar side where there are fewer visible satellites.
- Configure the Timing Client to use PTP peer devices on the network as an alternative time source (Sync_Source_Selection).
- Ensure that the GMT time zone parameter is set while you configure the Timing Client.

Mounting the Optional Antenna

Route the coax from the building's ingress to the Timing Client installation site and connect to the GPS server.

WARNING:

- **Locate the GPS antenna away from power lines, lighting systems, HVACs, and power circuits.**
- **When installing the GPS antenna, do not touch power lines or other sources of "live" power.**
- **Have a qualified technician and or certified electrician perform the installation.**

- Observe all local and regulatory standards and ordinances.
- Grounding the unit (metal mast or ground cable to the unit's base) is required for the lightning protection to work properly.

Changing the Password of Admin User Account

Juniper Networks assigns a default user account (admin/admin) with login class as Admin to a TCA6000 or TCA6500 Timing Client for logging in to the Timing Client. You can create and manage Read-Only or Read/Write user accounts in the TCA6000 or TCA6500 Timing Client by logging in as **admin**. For more information about TCA user account management, see "Managing TCA User Accounts" on page 35 and "TCA User Accounts Overview" on page 19.

BEST PRACTICE: Before installing the Timing Client on an active network, change the default password (admin) of the Admin user to maintain secure access to the Timing Client.

NOTE: You can reset passwords of the Admin user and the enable mode to factory defaults through the CLI, GUI, or by resetting the Timing Client. For more information about resetting of passwords, see "Changing/Resetting the Login Password for Admin User" on page 24 and "Resetting the Passwords of Both Admin User Account and Enable Mode to Factory Defaults" on page 122.

To change the password of the Admin user, one of the following methods may be used:

- Configuration through the craft port on the front panel:
  1. Login as **admin**.
     a. >**admin**<cr>
     b. >password: **admin**<cr>
  2. Enable privileged commands.
     a. >**enable**<cr>
     b. >password: **enable**<cr>
  3. Execute the following command to change the Admin user password:

     # config password
     Please input old password: **admin**<cr>
     Please input new password: **admin123**<cr>
     Please re-type new password: **admin123**<cr>

- Configuration from the management interface through the Ethernet port on the back panel:

  1. Connect a standard Ethernet cable between the Timing Client, Lan1, and the network port of the PC.
  2. Launch an Internet browser on your PC.
  3. In the **URL** field, type the following default IP address:

     http://192.168.0.75

     The Timing Client login page appears.
  4. In the **Login** field, enter the following:

     admin (Case sensitive—use all “lower” case)
  5. In the **password** field, enter the following:

     admin (Case sensitive—use all “lower” case)
  6. Click the **Login** button.
  7. Click the **Admin** tab and locate the **Password** tab across the top tabs of the Admin page.
  8. In the **Hostname** field, enter the name assigned to the Timing Client.
  9. In the **Old Password** field, enter the current password of the Admin user.
  10. In the **New Password** field, enter the new password to replace the old password.
  11. In the **Retype New Password** field, reenter the new password.
  12. Click the **Apply** button to save hostname and password changes to the memory.

NOTE: **All the examples in this guide use the default password (admin) for the Admin user.**

Assigning an IP Address to the TCA6000 or TCA6500 Timing Client

Juniper Networks assigns a default IP address to a TCA6000 or TCA6500 Timing Client to allow access to the user interface. The default IP address must be changed before installing the Timing Client on an active network. To change the IP address, one of the following methods may be used:

- Configuration through the craft port on the front panel:

  1. Log in as **admin**.
     a. >admin<cr>
     b. >password: **admin**<cr>

2. Enable privileged commands.

   a. >**enable**<cr>

   b. >password: **enable**

3. # config eth0 ip [ip-address] [mask] [gateway]

- Configuration from the management interface through the Ethernet port on the back panel:

  To change the IP address through the Ethernet port:

  1. Connect a standard Ethernet cable between the Timing Client, LAN1, and the network port of the PC.
  2. Apply power to the Timing Client; the unit can be previously powered.
  3. Launch an Internet browser on your PC.
  4. In the **URL** field, type the following default IP address:

     LAN1—http://192.168.0.75

     The Timing Client login page appears.
  5. In the **Login** field, enter the following:

     admin (Case sensitive–use all “lower” case)
  6. In the **password** field, enter the following:

     admin (Case sensitive–use all “lower” case)
  7. Click the **Login** button.
  8. Click the **Config** tab if it not already displayed (default).
  9. Select the **LAN1** button.
  10. Locate Mode in the Network section, select the **Static** or **DHCP** button that will be used to assign the Timing Client an IP address, and perform one of the following:

      a. Select the **Static** button and enter the following information in the fields above the Mode selection:

         - In the **IP Address** field, enter the IP address to be assigned to the Timing Client.
         - In the **Mask** field, enter the subnet mask to be assigned to the Timing Client.
         - In the **Gateway** field, enter the IP address of the gateway to be assigned to the Timing Client.
         - In the **Primary DNS** field, enter the IP address of the primary DNS to be assigned to the Timing Client.

NOTE: **Leave blank, if not required.**

- In the **Secondary DNS** field, enter the IP address of the secondary DNS to be assigned to the Timing Client.

NOTE: **Leave blank, if not required.**

Apply, save.

b. If the **DHCP** button is selected, the DHCP server will automatically provide the Timing Client with IP address information.

Apply, save.

Connect to the network.

c. Contact a network administrator to enable appropriate settings for the following:

- Speed (100Mbps, recommended)
- Duplex (Full-duplex, recommended)
- Auto negotiation (Disabled, recommended)

Visually Testing the TCA6000 or TCA6500 Timing Client

1. Connect the Timing Client and computer to the local network segment and launch the web browser.

NOTE: **The title banner displays TCA6000 as a generic model number for all TCA6000/TCA6500 models. The unique model number for the system configuration is displayed in the Status page.**

2. Open the Timing Client webpage by using the new IP address (from above), enter login/password.
3. Click the **Status** button and observe the System page. The following information should be present:
   - Model
   - Board S/N
   - System S/N
   - Software version
   - Hardware version
   - FPGA version

- Temperature
- MAC address—LAN1

4. Click the GPS page, and observe the following information:
   - Receiver status = Good
   - Antenna status = Good
   - Satellite status = Acquired

Verifying the Product T1/E1 Interface Support

The TCA6000 and TCA6500 Timing Clients ship with both T1 and E1 software images installed in the two internal non-volatile memory partitions. By default, the TCA6000 and TCA6500 Timing Clients use the E1 interface type. To select the T1 interface type, see "Upgrading the TCA6000 and TCA6500 Software" on page 51.

PART 3

Configuring and Upgrading the TCA6000 or TCA6500 Timing Client

CHAPTER 3

Configuring a TCA6000 or TCA6500 Timing Client

This chapter describes the procedure to configure the Juniper Networks TCA6000 and TCA6500 Timing Clients. The following topics are described in this chapter:

TCA User Accounts Overview

Juniper Networks assigns a default user account (admin/admin) with login class as Admin to a TCA6000 or TCA6500 Timing Client for logging in to the Timing Client. The user logging in to the Timing Client using the Admin user account can configure the Timing Client and create, delete or modify user accounts with login class as Read-Only or Read/Write.

The TCA software supports three predefined login classes to define the access privileges for the user accounts in your Timing Client. Table 3 on page 20 defines the login classes predefined in the TCA software.

Table 3: Login Classes for TCA User Accounts

Login Class	Access Privilege	Description
Admin	Create, Delete, or Modify	User can: • Configure all Timing Client features or parameters through CLI or WEB. • View all Timing Client configuration or log details through CLI or WEB.

Read/Write	Modify	User can:
		• Configure Timing Client features or parameters through CLI or WEB except Admin user functionalities such as creation, deletion, and modifying of user accounts.
		• View Timing Client configuration or log details through CLI or WEB except the following Admin user functionalities:
		  ◦ Viewing command history of other user accounts.
		  ◦ Viewing information about user accounts.

Read-Only	Show view	User can:
		• View Timing Client configuration or log details through CLI or WEB except the following Admin user functionalities:
		  ◦ Viewing command history of other user accounts.
		  ◦ Viewing information about user accounts.

The TCA software creates a separate log file for each user account to store the commands executed by the corresponding user. The software stores the session ID and timestamp in the log file to identify the various sessions for that particular user. The software deletes the log file created for the user account, when the Admin user deletes any Read-Only or Read/Write user account.

NOTE: **The software can store only a maximum of 150 commands in a log file.**

Guidelines for User Account Management

Keep in mind the following considerations when you (Admin) configure user accounts:

- The software supports only five user accounts.
- You cannot delete the default Admin user account assigned by Juniper Networks.
- You cannot create another Admin user account.
- The username should be 4 to 12 characters long. The characters can only include alphanumeric and underscore. No other special characters are allowed.

- The username should be unique.
- The password should be 4 to 12 characters long. The characters can include alphanumeric and special characters (that is, !@#$_).

Dynamic SSL Certificate Overview

The TCA 6000 or 6500 Timing Client enables you to access the GUI through Hypertext Transfer Protocol (HTTP) or Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS) based on the web mode configured by the Admin user. The Admin user can configure the Timing Client to use the customized key and certificate instead of the default key and certificate, when the GUI is accessed through HTTPS. By default, the Timing Client uses the default key and certificate when the GUI is accessed through HTTPS.

The Admin user can download the customized key and certificate files of **.pem** format in the Timing Client through CLI or GUI. The downloaded key file is stored as an **ssl_key.pem** file in the **etc/config** path. The downloaded certificate file is stored as an **ssl_cert.pem** file in the **etc/config** path. The Admin user can generate the customized files by using OpenSSL or FIPS 140-2 capable OpenSSL as trusted certification authority. For complete information and source of OpenSSL utility, see http://www.openssl.org/.

When you access the GUI through HTTPS, the Timing Client checks for the **ssl_key.pem** and **ssl_cert.pem** files in the **etc/config** path. If any one of the files is not available, the Timing Client uses the default key and certificate. If the files are available, the Timing Client checks the BEGIN header and the END footer in both the files. If the header and footer are valid in both the files, the Timing Client compares the key file with the certificate file. On successful match, the Timing Client loads the GUI and generates a syslog.

The Timing Client does not load the GUI but generates a syslog during the following scenarios:

- Mismatch identified between the key and certificate files.
- Invalid header or footer identified in one of the files.
- Validity of any file got expired.

The Admin user must keep the following conditions in mind when downloading the customized files:

- After downloading both the files, you must reboot the Timing Client for the changes to take effect.
- The Timing Client uses the default key and certificate if both or any one of the customized files is unavailable.
- You cannot modify the downloaded files but you can replace them with another ones.
- You should use only Secure Hash Algorithm (SHA-1) and RSA (1024 bits) cryptographic algorithms while generating the customized key and certificate files.

Accessing the User Interface

You can configure the TCA6000 or TCA6500 Timing Client using one of the following methods:

- Graphical user interface (GUI)
- Telnet
- Secured shell (SSH)

This chapter describes how to access the GUI. Accessing the Timing Client using Telnet and SSH is described in
"Using Telnet with the TCA6000 and TCA6500 Timing Clients" on page 121.

Requirements for Using the Graphical User Interface

To use the TCA6000 or TCA6500 GUI, log in to the embedded Web server with an Internet browser. The following browsers and versions are supported:

- Internet Explorer version 6.x or later
- Firefox version 1.5.0.7 or later (Firefox 3.0 is currently not supported)

Accessing the Graphical User Interface

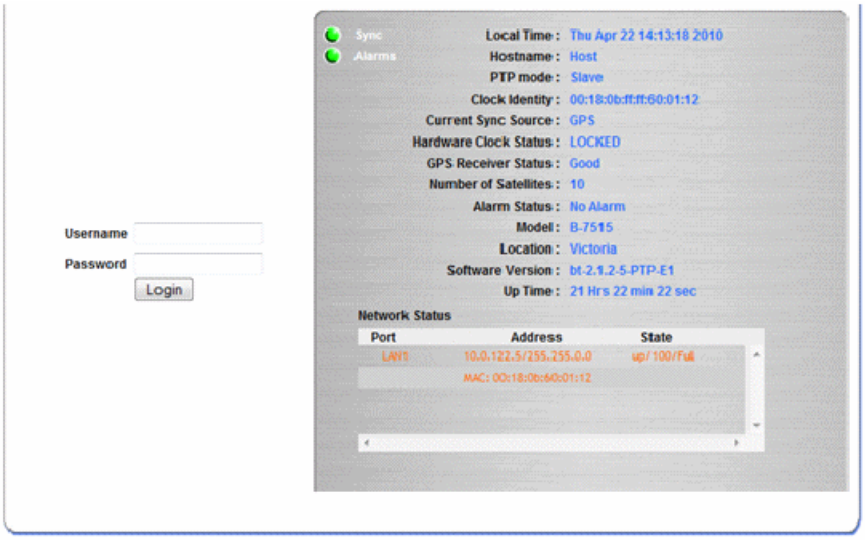
To access the GUI:

1. Open an Internet browser.
2. In the **address** or **URL** field enter the IP address assigned to the Timing Client to be accessed, using the following command:

   http://*ip_address*

   The Login page appears. See Figure 3 on page 23.

Figure 3: TCA6000 or TCA6500 Timing Client Login Page



3. In the **Username** field enter the username to be used to log in to the server.

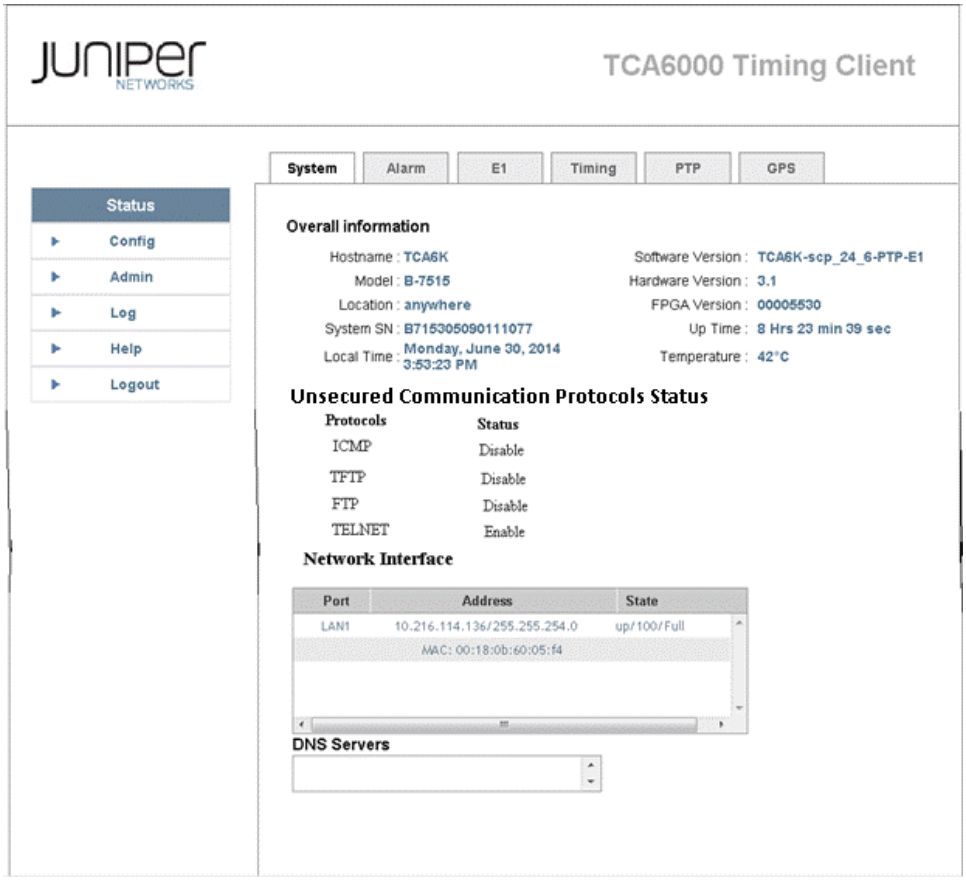
NOTE: The default username assigned by the Juniper Networks is admin. You cannot change the default username. You can create new user accounts from the config page by logging in as Admin user.

4. In the **Password** field enter the password required to log in to the server.

NOTE: The default password assigned by the Juniper Networks is admin. You can change the login password of the Admin user from the admin page.

5. Click the **Login** button. The Status page appears. See Figure 4 on page 24.

Figure 4: Timing Client Status Page—System Pane



The Timing Client GUI will automatically time out after 5 minutes of inactivity. The login and password will have to be reentered to gain access to the unit.

Changing/Resetting the Login Password for Admin User

We recommend that the TCA6000 or TCA6500 Timing Client login password of the Admin user be changed from the manufacturer set default to maintain secure access to the server.

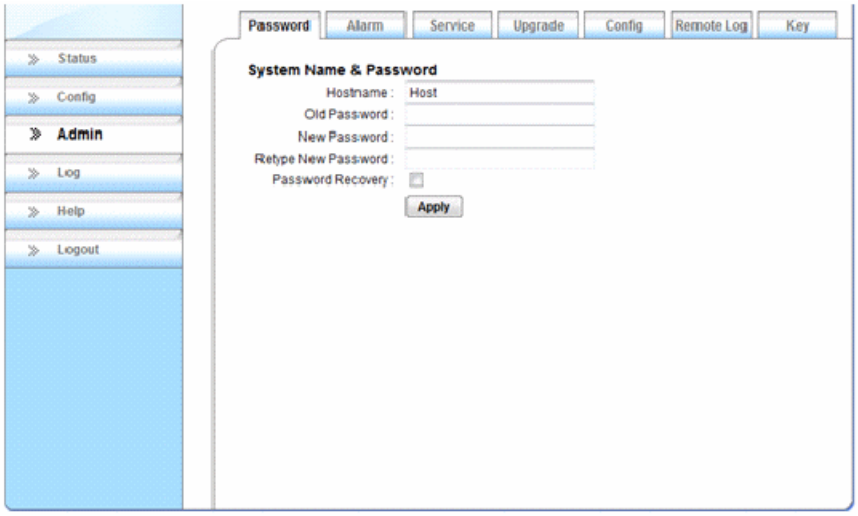
To change the login password of the Admin user:

1. Click the **Admin** tab.

   The Admin page appears. See Figure 5 on page 25.

NOTE: The Admin tab is visible only to the Admin user.

Figure 5: Timing Client Admin Page—Password Pane



2. In the **Hostname** field of the System Name & Password section, enter the hostname to be assigned to the Timing Client.
3. In the **Old Password** field, enter the current password of the Admin user.
4. In the **New Password** field, enter the new password.

NOTE: Passwords are case sensitive and accept alphanumeric characters. Passwords must contain a minimum of four characters.

5. In the **Retype New Password** field, retype the assigned (new) password.
6. Click the **Apply** button.

To reset passwords of the Admin user and the enable mode to factory defaults:

1. Click the **Admin** tab.

   The Admin page appears. See Figure 5 on page 25.

NOTE: The Admin tab is visible only to the Admin user.

2. Select the **Password Recovery** check box.

3. Click the **Apply** button to reset passwords of the Admin user and the enable mode to factory defaults.

NOTE: If you have forgotten the password of the Admin user, you can reset the password to factory default by resetting the Timing Client. For more information about resetting the password by resetting the Timing Client, see "Resetting the Passwords of Both Admin User Account and Enable Mode to Factory Defaults" on page 122.

Changing the IP Address

The TCA6000 and TCA6500 Timing Clients are configured to use the manufacturer's default static IP address assigned to the Ethernet port. The user interface is used to manually change the IP address of the Ethernet port and configure or change VLAN settings for the Ethernet port.

NOTE: You cannot configure Ethernet and VLAN port addresses to be in the same subnet (that is, all logical and physical interfaces should be configured to be in different subnets).

To change the address information for Ethernet port:

1. Click the **Config** tab. The Config page appears. See Figure 6 on page 28.
2. In the **Mode** field, click the **Static** button to activate the address fields.
3. In the **IP Address** field, enter the IP address to be assigned to the Timing Client.

NOTE: After the IP address change, click **Apply**. Access the Timing Client using the new IP address to view and configure the current settings.

4. In the **Mask** field, enter the subnet mask to be assigned to the Timing Client.
5. In the **Gateway** field, enter the IP address of the gateway that will be registered by the Timing Client.
6. In the **Primary DNS** field, enter the IP address of the Primary DNS that will be registered by the Timing Client.

NOTE: Leave blank, if not required.

7. In the **Secondary DNS** field, enter the IP address of the Secondary DNS that will be registered by the Timing Client.

NOTE: Leave blank, if not required.

8. To determine whether an IP address is currently assigned, enter the IP address in the **Ping** field and click **Go**. If the ping goes through, then the IP address is already taken. Otherwise, it is not assigned, and can be used by the Timing Client.
9. Click the **Apply** button to save and implement the changes.

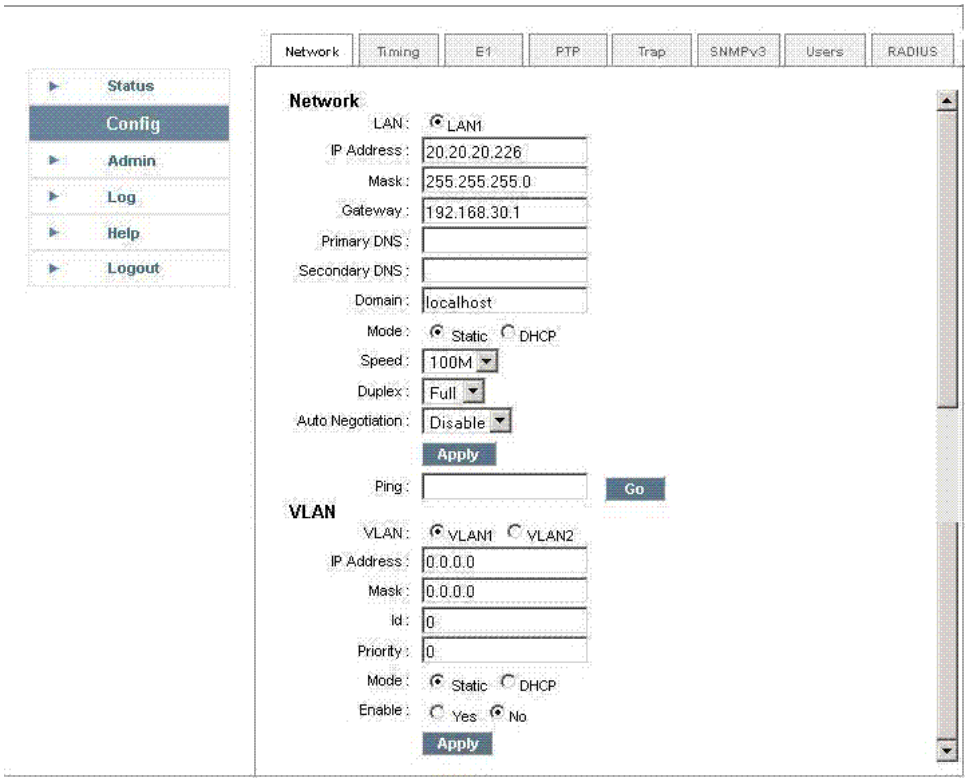
To configure or change VLAN settings for the Ethernet port:

1. Click the **Config** tab. The Config page appears. See Figure 6 on page 28.
2. In the **Mode** field, select the **Static** option button to activate the VLAN address fields.
3. In the **VLAN** field, select a VLAN (VLAN1 or VLAN2) for which settings should be configured.
4. In the **IP Address** field, enter the IP address for the selected VLAN.
5. In the **Mask** field, enter the subnet mask assigned to the selected VLAN.
6. In the **Id** field, enter a unique identifier in the range 2 through 4095 that is used to identify the VLAN encapsulation packet.

NOTE: If the ID you have entered is already being used by any other VLAN, a warning message is displayed.

7. In the **Priority** field, enter a priority value for the VLAN header to be used for differential services transporting the packet.
8. In the **Enable** field, select the **Yes** option button to enable VLAN encapsulation for IP packets, or select the **No** option button to disable VLAN encapsulation for IP packets.
9. Click **Apply** to save and implement the changes.

Figure 6: Timing Client Config Page—Network Pane



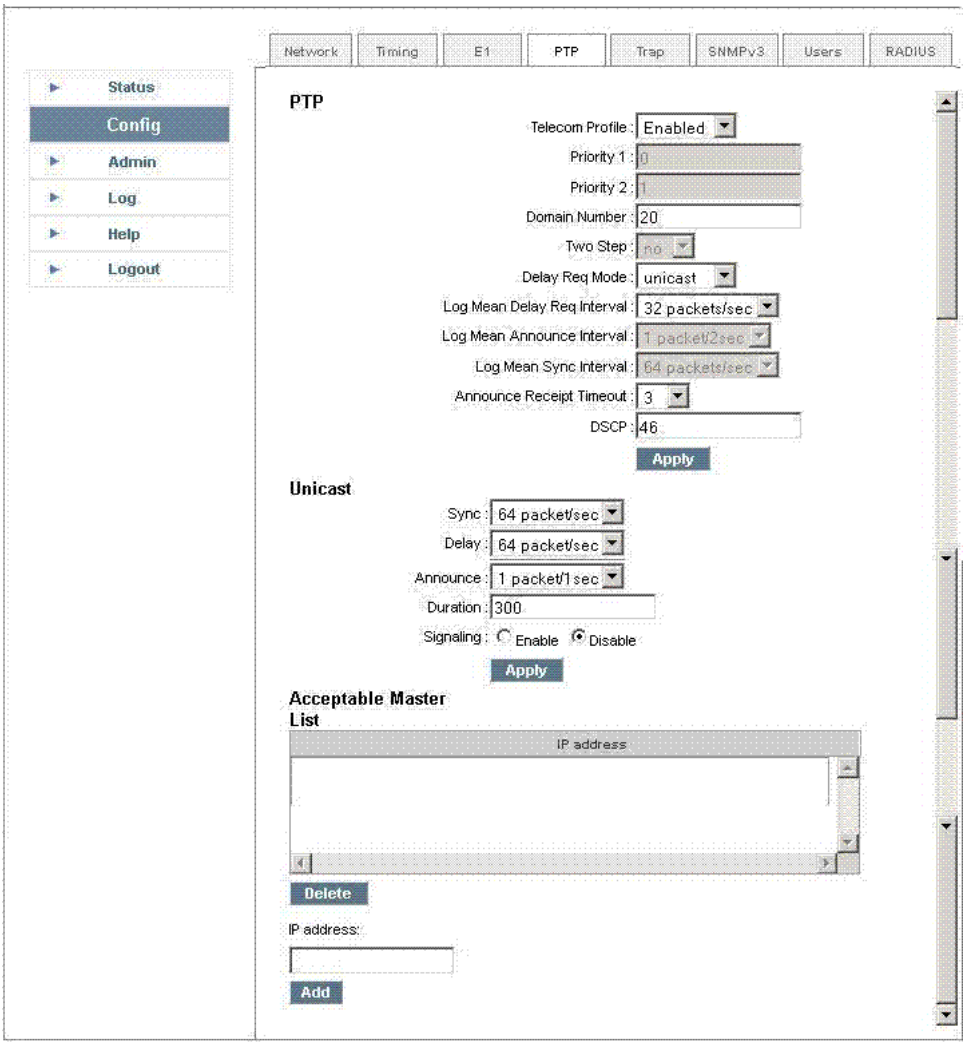
Setting IEEE 1588-2008 Precision Time Protocol (PTP) Parameters

The IEEE 1588-2008 Precision Time Protocol (PTP) section on the Config page identifies the parameters that can be set for the TCA6000 or TCA6500 Timing Client to provide synchronization using the Precision Time Protocol. To configure the Timing Client to provide PTP time synchronization:

1. Click the **Config** tab. The Config page appears.

   Locate the **PTP** tab across the top of the Config page. See Figure 7 on page 29.

Figure 7: Timing Client Config Page—PTP Pane



The PTP pane on the configuration page allows the setting of parameters which are part of a distributed synchronous network using Precision Time Protocol (PTP).

To configure the Timing Client to provide PTP time synchronization, configure the fields in the PTP pane:

1. The **Domain Number** field specifies the domain number which the TCA6000 or TCA6500 Timing Client has been assigned to. Enter a value within the range 0 through 255 to set the domain number associated with the network broadcast domain the unit will join. This number needs to be same domain number of at least one TCA6000 or TCA6500 Timing Server that is reachable through the network.
2. In the **Delay Req Mode** field, two options are available.

   NOTE: **The associated TCA6000 or TCA6500 Timing Server needs to be configured to the same profile selected.**

   Unicast (Default)—A one-to-one connection between a server and a client. This uses unicast messaging in both downstream and upstream direction with respect to the Timing Server.

   Multicast—A one-to-many relationship between a server and a client. This uses multicast messaging for the downstream and unicast for the upstream direction with respect to the Timing Server. This is referred to a Juniper Type 1 profile in the Timing Server configuration.
3. From the Log Mean Delay Request Interval list, select a delay request interval rate from the options: **32 packets/sec** and **64 packets/sec**.

   NOTE: **It is recommended to select 64 packets/sec.**
4. From the Announce Receipt Timeout list, select a timeout period for the announce event messages.
5. In the **DSCP** field, enter the Differential Service (DiffServ) value for the IP packet.
6. Click the **Apply** button to save the PTP parameter changes.

To configure the unicast related parameters:

1. From the Delay Req Mode list, select **unicast**.
2. From the Sync list, select a sync message rate from the options: **32 packet/sec** and **64 packet/sec**.

   NOTE: **It is recommended to select 64 packet/sec.**
3. From the Delay list, select a delay response message rate from the options: **32 packet/sec** and **64 packet/sec**.

   NOTE: **It is recommended to select 64 packet/sec.**
4. From the Announce list, select an announce message rate from the options: **1 packet/1 sec**, **1 packet/2 sec**, **1packet/4 sec**, and **1packet/8 sec**.

5. In the **Duration** field, enter the Timing Client expiration duration for sending signaling messages without receiving acknowledgements from the Grandmaster.
6. In the **Signaling** field, select an option button to enable or disable the sending of signaling messages to the Grandmaster.
7. Click the **Apply** button to save the unicast configuration.

To add the acceptable Grandmasters for the Timing Client:

1. In the **IP Address** field, enter the IP address of the acceptable Grandmaster for the Timing Client.
2. Click the **Add** button to add the acceptable Grandmaster entry in the **Acceptable Master List** window.

To delete the acceptable Grandmaster entry:

1. Select the Grandmaster entry that you want to delete from the **Acceptable Master List** window.
2. Click the **Delete** button to delete the entry.

Configuring Alarms

How the TCA6000 or TCA6500 Timing Client handles alarms during normal operation can be specified. To configure the alarms:

1. Click the **Admin** tab. The Admin page appears.
2. Click the **Alarm Profile** tab. See Figure 8 on page 32.
3. For each alarm, the following parameters can be configured:
   a. Select the **Clear Now** check box to clear an alarm immediately. This only applies to non-transient (box gray filled) and not transient alarms.
   b. Select the **Auto Clear** check box to clear an alarm automatically after it has been active for the **Auto Clear Expiration** period of 1-24 hours. This only applies to non-transient (box gray filled) and not transient alarms.
   c. In the **Severity** field, select the flag to accompany this alarm. Select:

      Critical—Indicates the highest level alarm and is severely affecting traffic. This needs immediate attention. The following alarms are directly related to this level:

      TE1_LOS, TE1_LOF, FREQ_FREERUN, LINK_DOWN

      Major—Indicates this alarm needs immediate attention. The following alarms are recommended for this level:

      PTP_SERVER_UNREACHABLE, LOSS_OF_POWER_FEED, FREQ_HOLDOVER

      Minor—Indicates this alarm needs attention but is not urgent. The following alarms are recommended for this level:

SYS_CONFIG_CHANGE, TE1_AIS, TE1_RAI, PTP_SERVER_CHANGE, FREQ_REF_INPUT_CHANGE, FREQ_INPUT_QUALITY_CHANGE, LINK_DOWN, TIMING_OSC_DAC

None—Indicates this alarm is for information only. The following alarms are recommended for this level:

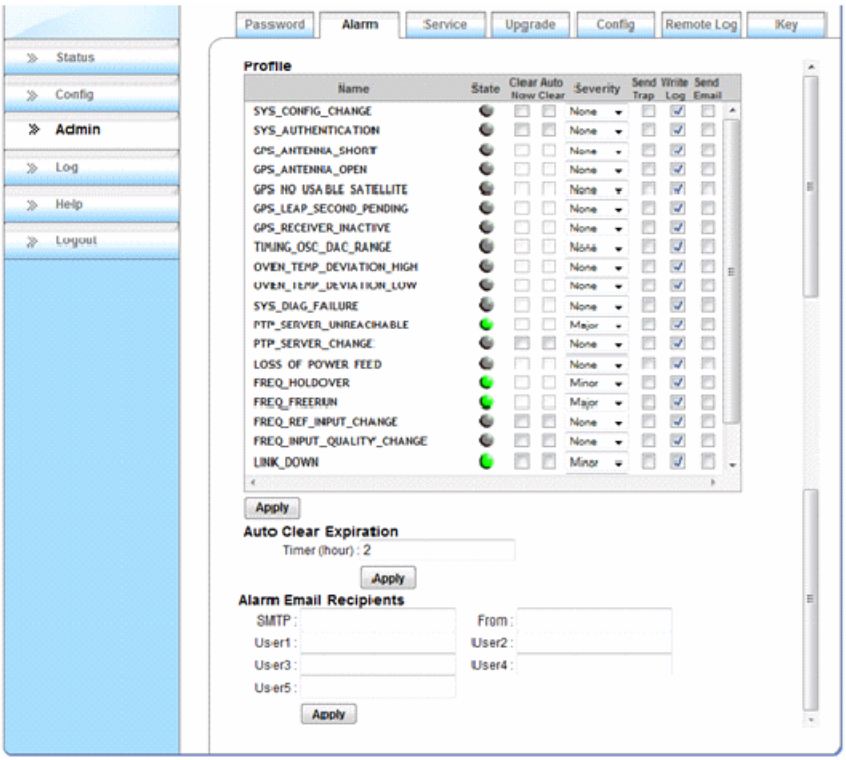
SYS_AUTHENTICATION, OVEN_TEMP_DEVIATION_HIGH, OVEN_TEMP_DEVIATION_LOW, LINK_UP, TIMEPROBE_DISABLE, FREQ_ACQUIRING

d. Select the **Send Trap** check box. The Timing Client will send the alarm to the Trap destinations identified on the Config page.

e. Select the **Write Log** check box. The Timing Client will send the alarm to the local log file.

f. Select the **Send to Email** check box. The Timing Client will send an e-mail message about this alarm to the users identified in the Alarm E-mail Recipients section of the **Alarm** tab.

Figure 8: Timing Client Admin Page—Alarm Pane



Configuring Traps

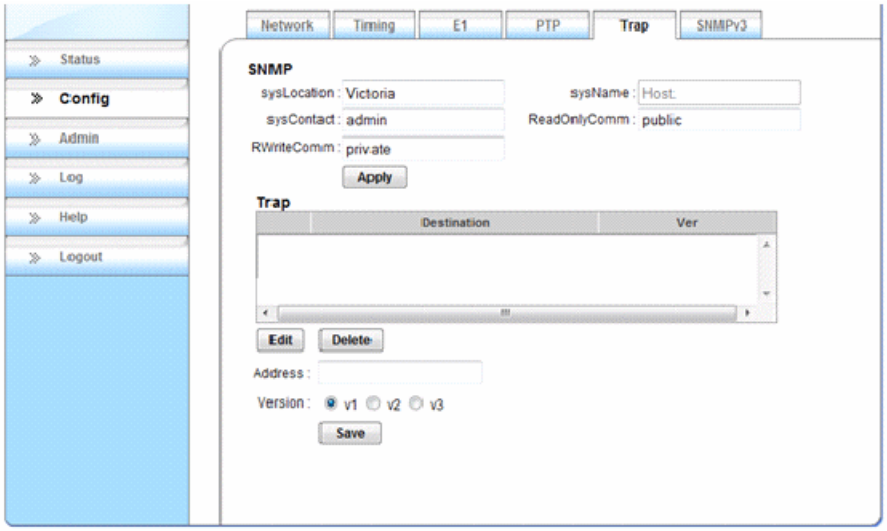
The TCA6000 and TCA6500 Timing Clients can be configured to send event information to trap destinations on a network.

Specifying SNMPv3 Contacts

The TCA6000 and TCA6500 Timing Clients can be configured to send alarm information to SNMP community files. To configure the Timing Client to send information to community files:

1. Click the **Config** tab. The Config page appears.
2. Locate the **Trap** tab at the top right of the screen. See Figure 9 on page 33.
3. In the **sysLocation** field, enter the location where the Timing Client is located.
4. In the **sysName** field, enter the name to be used to identify the Timing Client.
5. In the **sysContact** field, enter the X-address of the manager to be used by the Timing Client.
6. In the **ReadOnlyComm** field, enter the string that you want the Timing Client to use to access the local SNMP read community.
7. In the **RWriteComm** field, enter the string to be used by the Timing Client to access the local SNMP read community.
8. Click **Apply** to save changes to memory.

Figure 9: Timing Client Config Page—Trap Pane



Creating Trap Targets

To create a Trap destination, perform the following from the Trap pane, as shown in Figure 9 on page 33.

1. Click the **Config** tab.
2. Locate the **Trap** tab across the top of the **Config** screen.
3. In the **Address** field, enter the IP address or domain name where the Timing Client will send event information.
4. In the Version area, select the button displaying the version of SNMP supported by the Trap.
5. Click the **Save** button to save changes to memory.

Deleting Trap Targets

To delete a Trap destination:

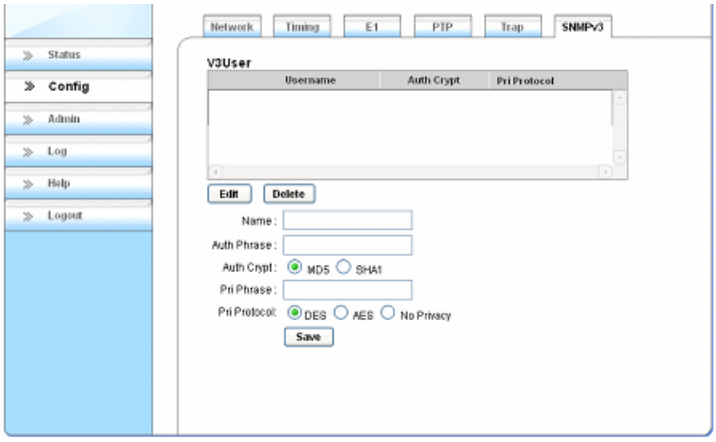
1. Click the **Config** tab.
2. Locate the **Trap** tab across the top tabs of the **Config** screen.
3. Click the Trap address to be deleted.
4. Click the **Delete** button to remove the entry from the **Trap** window and from memory.

Creating SNMPv3 Users

The TCA6000 and TCA6500 Timing Clients support security measures in SNMPv3. To create SNMPv3 users:

1. Click the **Config** tab. The Config page appears.
2. Click the **SNMPv3** tab. See Figure 10 on page 35.
3. In the **Name** field, enter the username that will be used to login to SNMPv3 log files.
4. In the **Auth Phrase** field, enter the authentication phrase to be used.
5. In the **Auth Crypt** area, select the encryption method to be used.
6. In the **Pri Phrase** field, enter the private phrase to be used.
7. In the **Pri Protocol** field, select the privilege level to be used. Select:
   - DES: The user must use the authentication phrase to login.
   - AES: The user is not required to use the authentication phrase to login.
   - No Privacy: The user is required to use the authentication phrase and the private phrase to log in.
8. Click the **Save** button to save the user information in the V3User window and to save changes to memory.

Figure 10: Timing Client Config Page—SNMPv3 User Pane



Managing TCA User Accounts

The TCA6000 and TCA6500 Timing Clients support multiple user accounts to be created and managed by the Admin user. Juniper Networks assigns a default user account (admin/admin) with login class as Admin to a TCA6000 or TCA6500 Timing Client for logging in to the Timing Client. This Admin user account allows the administrator to create and manage multiple user accounts with login class as Read-Only and Read/Write.

The TCA user accounts can be managed by:

- Creating an User Account on page 35
- Modifying an Existing User Account on page 36
- Deleting an Existing User Account on page 37

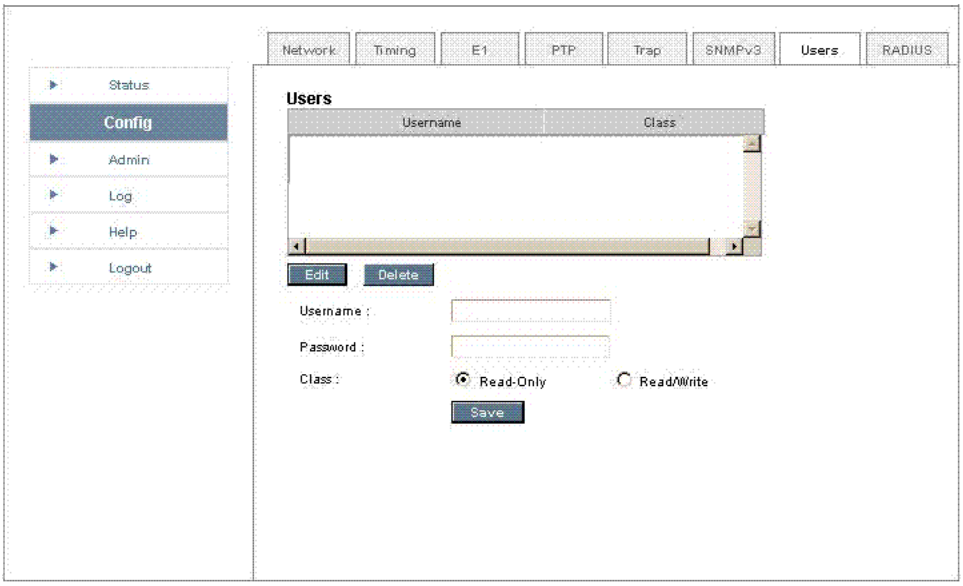
Creating an User Account

To create a new user account:

NOTE: **You can create only a maximum of five user accounts.**

1. Log in to the Timing Client as Admin user.
2. Click the **Config** tab.
3. Locate the **Users** tab across the top tabs of the **Config** page. See Figure 11 on page 36.

Figure 11: Timing Client Config Page—Users Pane



4. In the **Username** field, enter the username for the new user account.
5. In the **Password** field, enter the password for the new user account.
6. In the **Class** field, select an option button to set the login class for the new user account as Read-Only or Read/Write.
7. Click the **Save** button to create a new user account.

Modifying an Existing User Account

To modify an existing user account:

NOTE: **You cannot modify the username.**

1. Log in to the Timing Client as Admin user.
2. Click the **Config** tab.
3. Locate the **Users** tab across the top tabs of the **Config** page. See Figure 11 on page 36.
4. In the **Users** window, select the user account to be modified.
5. Click the **Edit** button to populate the details of the selected user account in the **Username**, **Password**, and **Class** fields.
6. Modify the password or class for the selected user account.

NOTE:

- If you change the password, all the active sessions for the corresponding user are not logged out. The user must use the new password for new sessions.
- If you change the class, all active sessions for the corresponding user are logged out.

7. Click the **Save** button to save the changes done.

Deleting an Existing User Account

To delete an existing user account:

1. Log in to the Timing Client as Admin user.
2. Click the **Config** tab.
3. Locate the **Users** tab across the top tabs of the **Config** page. See Figure 11 on page 36.
4. In the **Users** window, select the user account to be deleted.
5. Click the **Delete** button to delete the selected user account.

NOTE: All active sessions for the deleted user are logged out.

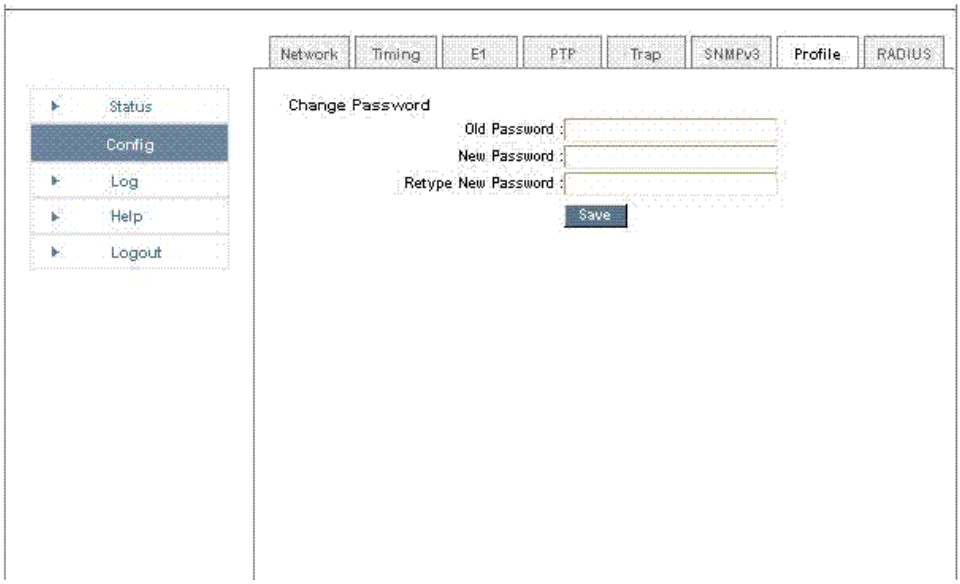
Changing the Login Password for Read/Write User

The TCA6000 and TCA6500 timing clients allow Read/Write users to change their password configured and shared by the TCA Admin user.

To change your (Read/Write user) password:

1. Log in to the Timing Client as Read/Write user.
2. Click the **Config** tab.
3. Locate the **Profile** tab across the top tabs of the **Config** page. See Figure 12 on page 38.

Figure 12: Timing Client Config Page—Profile Pane



4. In the **Old Password** field, enter your current password.
5. In the **New Password** field, enter the new password to replace the old password.
6. In the **Retype New Password** field, reenter the new password.
7. Click **Save** button to change your password and save the changes.

NOTE: **The new password will be effective from next login onwards. The current session is not affected.**

Configuring User Authentication through RADIUS

The TCA6000 and TCA6500 Timing Clients support RADIUS server authentication, local authentication, or both based on the configured authentication order to authenticate the user logging in to the Timing Client.

When you configure the authentication order as RADIUS server authentication followed by the local authentication, the Timing Client passes the information about the logging user to the configured RADIUS servers for authentication. If any one of the RADIUS server successfully authenticates the user, then the Timing Client allows the user to login. If all the configured RADIUS servers fail to authenticate the user or configured RADIUS servers are not available, then the Timing Client performs the local authentication and allows the user to login after successful local authentication. The Timing Client blocks the logging user if both RADIUS and local authentication fails.

When you configure the authentication order as local authentication followed by the RADIUS server authentication, the Timing Client performs the local authentication to grant access to the logging user. If the local authentication fails to authenticate the user, then the Timing Client passes the information about the logging user to the configured

RADIUS servers for authentication. If any one of the RADIUS server successfully authenticates the user, then the Timing Client allows the user to login. If all configured RADIUS servers fail to authenticate the user, then the Timing Client denies access to the logging user.

When you configure the authentication order as RADIUS server authentication only, the Timing Client passes the information about the logging user to the configured RADIUS servers for authentication. If any one of the RADIUS server successfully authenticates the user, then the Timing Client allows the user to login. If all configured RADIUS servers fail to authenticate the user, then the Timing Client denies access to the logging user. If all configured RADIUS servers are not available, then the Timing Client performs local authentication and allows the user to login after successful local authentication.

When you configure the authentication order as local authentication only, the Timing Client performs the local authentication to grant or deny access to the user logging in to the Timing Client.

NOTE:

- The selection of RADIUS authentication server to authenticate user is based on the order in the RADIUS authentication server list.
- The user authentication process is implemented only for the Access Request, Access Reject, and Access Accept messages.
- The user authentication process is not supported for shell users.

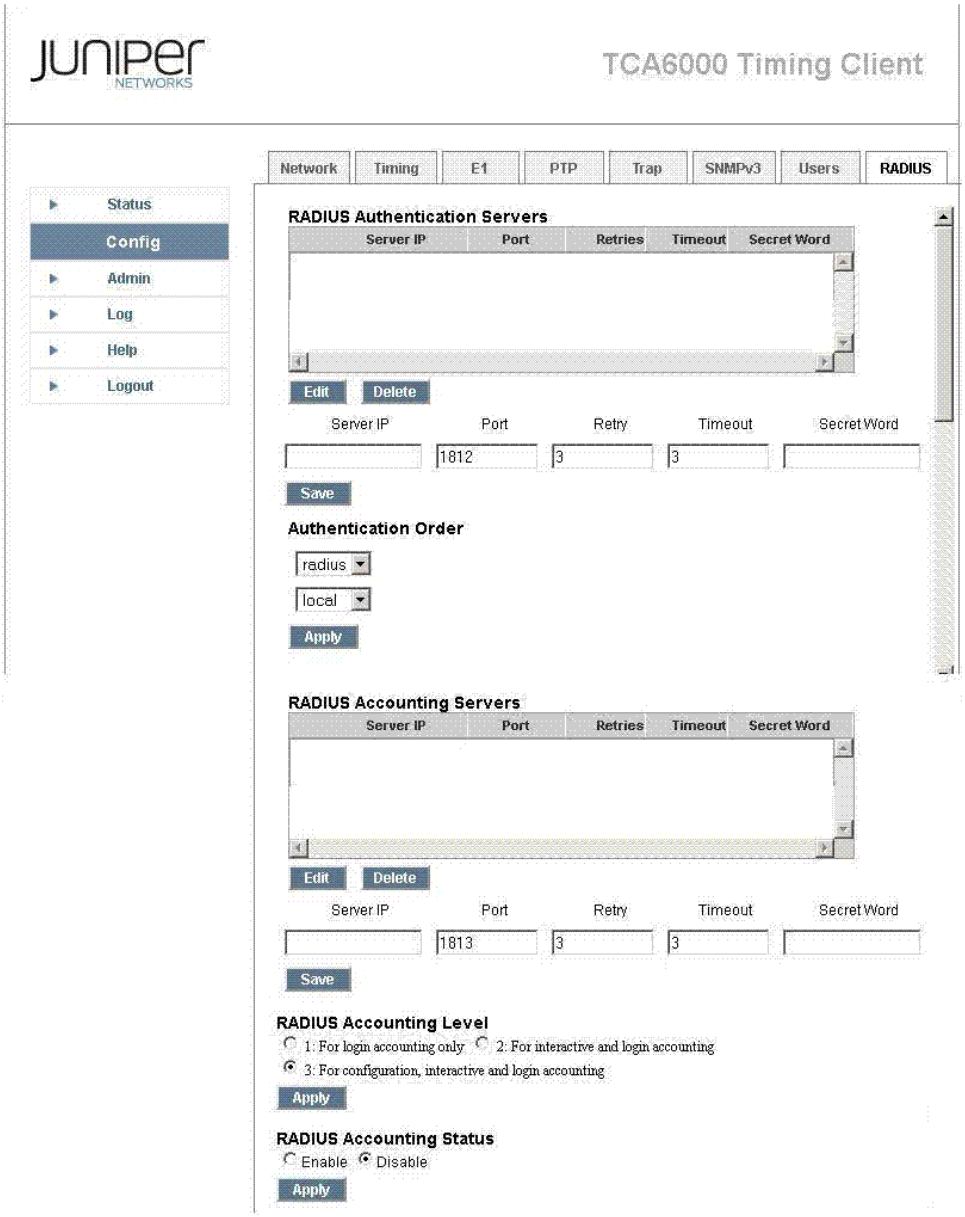
The user authentication process protects the Timing Client from being accessed by unauthorized persons. The usage of RADIUS authentication servers provides the following advantages:

- Management of multiple user credentials on remote machine for detailed logging.
- Centralized user information and authentication process at one server.
- No loss of user information due to Timing Client damage.

To configure user authentication process:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 13 on page 40.

Figure 13: Timing Client Config Page—RADIUS Pane (Authentication)



3. Configure the RADIUS authentication server details.
4. Click the **Save** button to save the authentication server configuration.

5. Select the authentication order.
6. Click the **Apply** button to apply the configured authentication order.

The following sections describe RADIUS authentication server configuration and authentication order configuration:

Adding a New RADIUS Authentication Server Entry

To add a new RADIUS authentication server entry to the authentication server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 13 on page 40.
3. In the **Server IP** field, enter the IP address of the RADIUS authentication server to be used for user authentication.
4. In the **Port** field, enter the port through which the specified RADIUS authentication server is contacted for user authentication.
5. In the **Retry** field, enter the number of attempts should be made for contacting the specified RADIUS authentication server.
6. In the **Timeout** field, enter the time in seconds till which the Timing Client waits for a response from the specified RADIUS authentication server.
7. In the **Secret Word** field, enter the password shared with the specified RADIUS authentication server.
8. Click the **Save** button to add the RADIUS authentication server entry in the **RADIUS Authentication Servers** window and memory.

Deleting a RADIUS Authentication Server Entry

To delete a RADIUS authentication server entry from the authentication server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 13 on page 40.
3. In the **RADIUS Authentication Servers** window, click the RADIUS authentication server entry to be deleted.
4. Click the **Delete** button to remove the entry from the RADIUS Authentication Server window and memory.

Modifying a RADIUS Authentication Server Entry Details

To modify the details of a RADIUS authentication server entry existing in the authentication server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 13 on page 40.
3. In the **RADIUS Authentication Servers** window, select the RADIUS authentication server entry to be modified.
4. Click the **Edit** button to populate the values of the selected RADIUS authentication server entry in the **Server IP**, **Port**, **Retry**, **Timeout**, and **Secret Word** fields.
5. Modify the populated values.
6. Click the **Save** button to save the changes done in the selected RADIUS authentication server entry.

Configuring Authentication Order

To configure the authentication order:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 13 on page 40.
3. In the first drop box, select the type of authentication to be performed initially. Select:
   - radius: To authenticate the user using the configured RADIUS authentication servers.
   - local: To authenticate the user using local settings.
4. In the second drop box, select the type of authentication to be performed on failure or unavailability of initial authentication. Select:
   - radius: To authenticate the user using the configured RADIUS authentication servers.
   - local: To authenticate the user using local settings.
5. Click the **Apply** button to save the authentication order.

Configuring RADIUS Accounting

The TCA6000 and TCA6500 Timing Clients support RADIUS accounting for the user logged in to the Timing Client. Once the user is logged in to the Timing Client, the Timing Client passes the accounting information to the configured RADIUS accounting servers. The Timing Client stops the accounting process when the user session is closed either voluntarily or involuntarily. The Timing Client waits for acknowledgment from the accounting servers for each accounting packet.

When the RADIUS accounting is enabled, the Timing Client tries to log the accounting information in any one of the configured RADIUS accounting server based on the

configured timeout period and number of retries. When the logging of accounting information fails for all configured accounting server, the Timing Client raises an ACCOUNTING_SERVER_UNAVAILABLE alarm.

When the RADIUS accounting server is unavailable, the accounting information (latest 15 commands) is buffered. The Timing Client sends the buffered information to the RADIUS accounting server after the server becomes available.

The accounting process supports login accounting, interactive commands accounting, and configuration commands accounting.

NOTE:

- The selection of RADIUS accounting server to log the accounting information is based on the order in the RADIUS accounting server list.
- The accounting process is implemented only for the Accounting Request and Accounting Response messages.
- The RADIUS accounting is not supported for shell users.
- The accounting process does not support immediate accounting and accounting of web configurations.

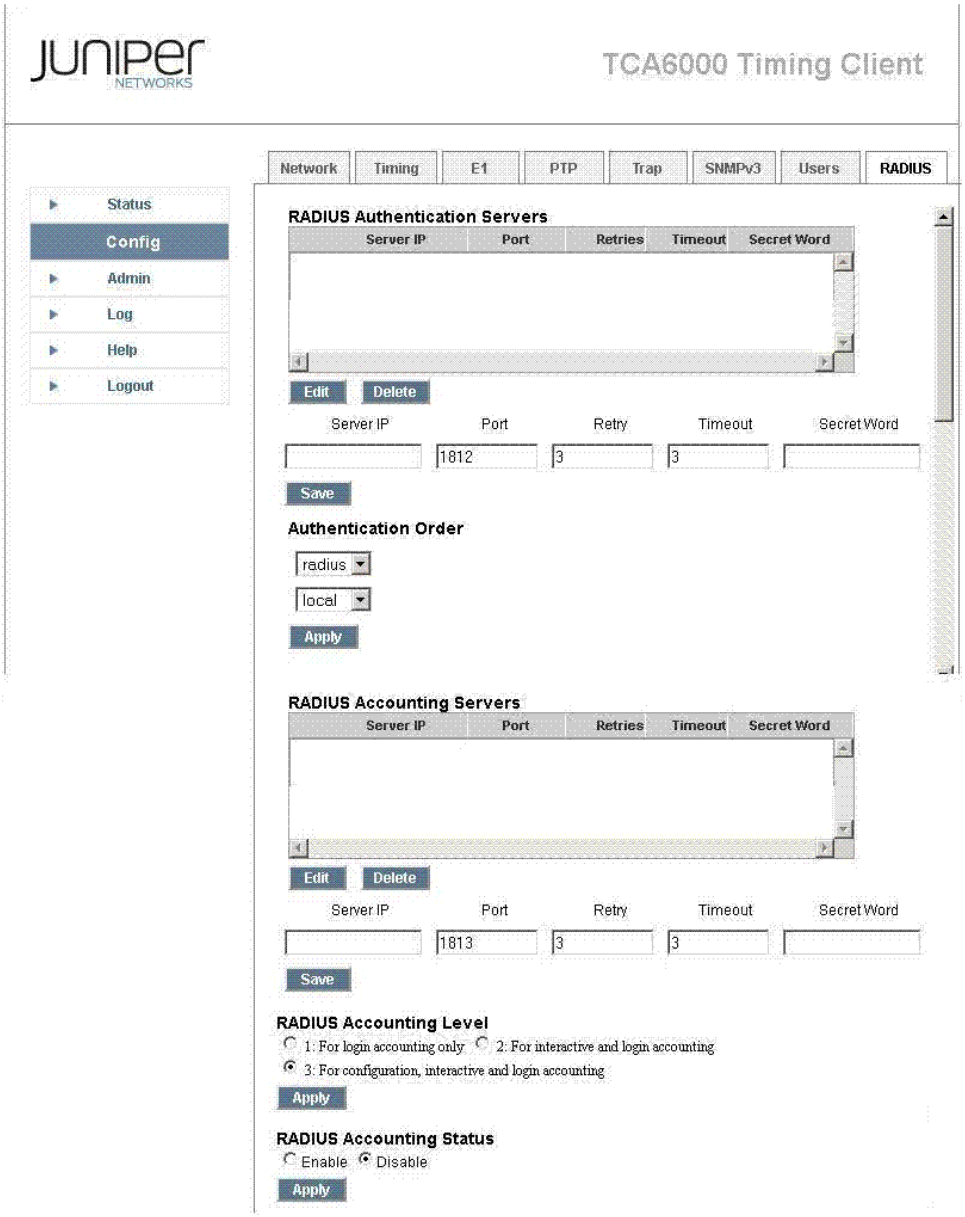
The usage of RADIUS accounting servers provides the following advantages:

- Centralized usage history of all users on one server.
- No loss of usage history of users due to Timing Client damage.

To configure RADIUS accounting:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 14 on page 44.

Figure 14: Timing Client Config Page—RADIUS Pane (Accounting)



3. In the **RADIUS Accounting Status** field, select the **Enable** option to enable RADIUS accounting.
4. Click the **Apply** button to apply RADIUS accounting status configuration.
5. Configure the RADIUS accounting server details.
6. Click the **Save** button to save the accounting server configuration.

7. In the **RADIUS Accounting Level** field, select the type of accounting information to be logged in the RADIUS accounting server.
8. Click the **Apply** button to apply the configured RADIUS accounting level.

The following section describe RADIUS accounting server configuration:

- Adding a New RADIUS Accounting Server Entry on page 45
- Deleting a RADIUS Accounting Server Entry on page 45
- Modifying a RADIUS Accounting Server Entry Details on page 46

Adding a New RADIUS Accounting Server Entry

To add a new RADIUS accounting server entry to the accounting server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 14 on page 44.
3. In the **Server IP** field, enter the IP address of the RADIUS accounting server to be used for accounting.
4. In the **Port** field, enter the port through which the specified RADIUS accounting server is contacted for accounting.
5. In the **Retry** field, enter the number of attempts should be made for contacting the specified RADIUS accounting server.
6. In the **Timeout** field, enter the time in seconds till which the Timing Client waits for a response from the specified RADIUS accounting server.
7. In the **Secret Word** field, enter the password shared with the specified RADIUS accounting server.
8. Click the **Save** button to add the RADIUS accounting server entry in the RADIUS Accounting Servers window and memory.

Deleting a RADIUS Accounting Server Entry

To delete a RADIUS accounting server entry from the accounting server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 14 on page 44.
3. In the **RADIUS Accounting Servers** window, click the RADIUS accounting server entry to be deleted.
4. Click the **Delete** button to remove the entry from the RADIUS Accounting Servers window and memory.

Modifying a RADIUS Accounting Server Entry Details

To modify the details of a RADIUS accounting server entry existing in the accounting server list:

1. Click the **Config** tab.
2. Locate the **RADIUS** tab across the top tabs of the **Config** page. See Figure 14 on page 44.
3. In the **RADIUS Accounting Servers** window, select the RADIUS accounting server entry to be modified.
4. Click the **Edit** button to populate the values of the selected RADIUS accounting server entry in the **Server IP**, **Port**, **Retry**, **Timeout**, and **Secret Word** fields.
5. Modify the populated values.
6. Click the **Save** button to save the changes done in the selected RADIUS accounting server entry.

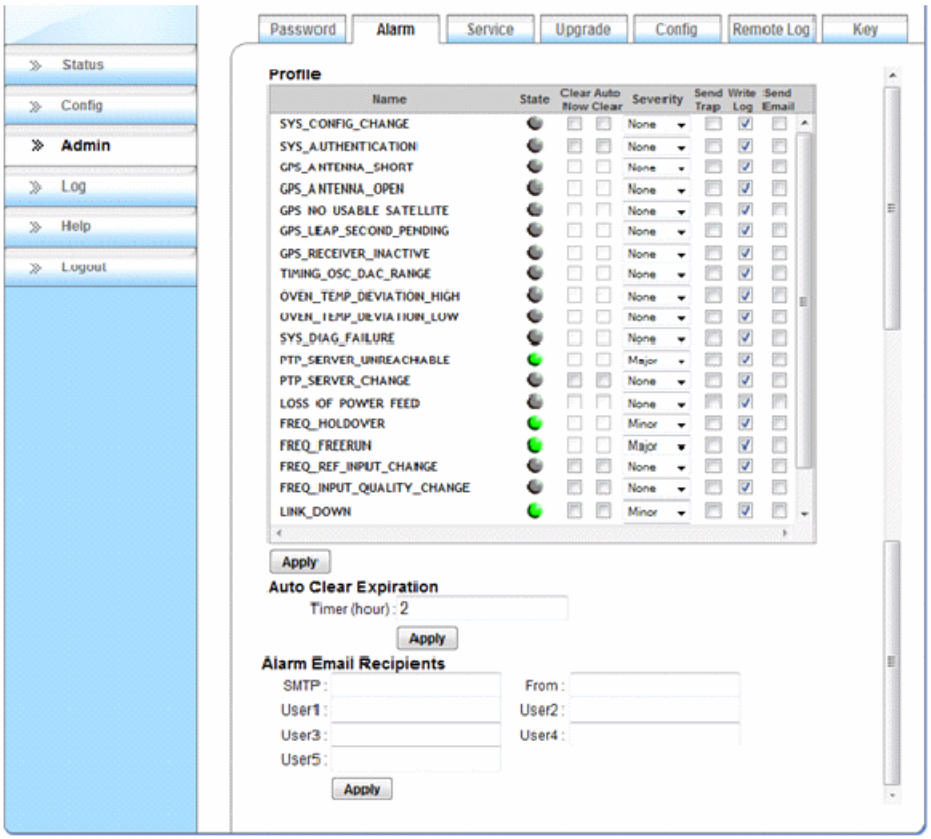
Specifying Alarm Recipient E-Mail Address Destinations

Adding a User to the E-Mail List

The TCA6000 and TCA6500 Timing Clients can be configured to send e-mail alarm event messages directly to selected users. To add a user to the list of e-mail recipients:

1. Click the **Admin** tab.
2. Locate the **Alarm** tab across the top tabs of the Admin page. See Figure 15 on page 47.
3. In the Alarm Email Recipients section:
   a. In the **SMTP** field, enter the IP Address or domain name of the e-mail server the Timing Client will register to send e-mail messages.
   b. In the **User x** field, enter the IP address or domain name of the user the Timing Client will send alarm event information to.
   c. In the **From** field, enter the IP address or domain name of the from address the Timing Client will register to send e-mail messages.
4. Click the **Apply** button to save your changes to memory.

Figure 15: Timing Client Admin Page—Alarm Pane



Removing Users from the Alarm Event Recipient List

To remove a user from the list of recipients who receive alarm events:

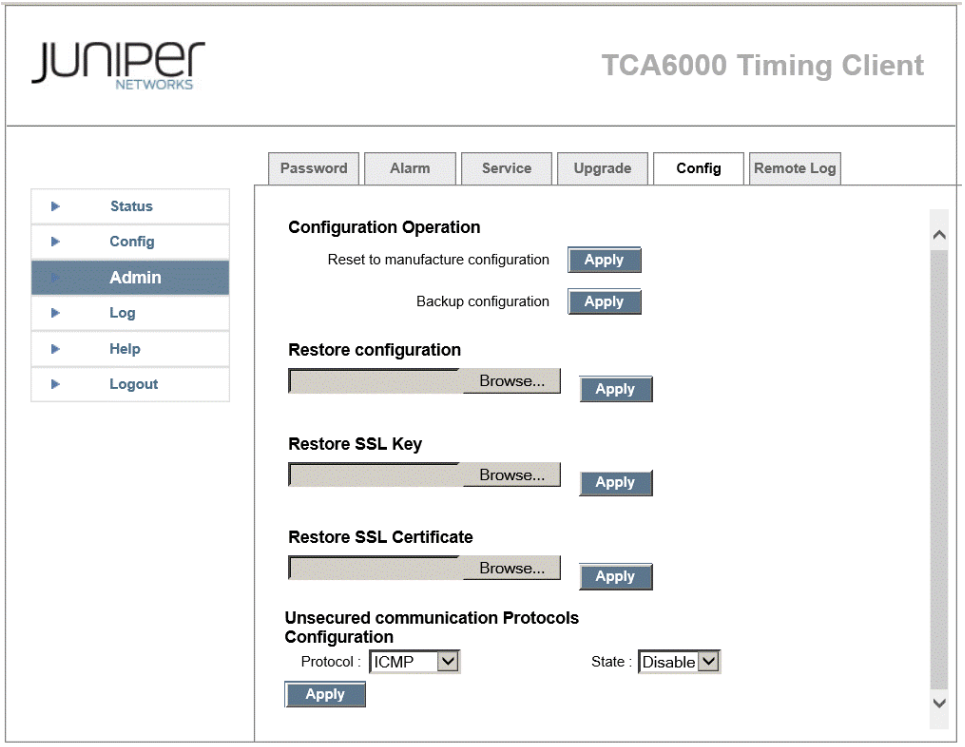
1. Click the **Admin** > **Alarm** tabs.
2. In the **Alarm Email Recipient** section, locate the **User** field that contain the address of the recipient(s) to be removed.
3. Highlight all addresses, and press the **Delete** key.
4. Click the **Apply** button to save changes to memory.

Resetting Factory Defaults

The TCA6000 and TCA6500 parameters can be reset to the manufacturer's default parameters at any time. To reset the unit to the manufactures default parameters:

1. Click the **Admin** > **Config** tabs. See Figure 16 on page 48.
2. Locate the Configuration Operation section on the left-hand side of the page.
3. Click the **Apply** button next to the text "Reset to manufacture configuration" to reset the parameters to their default configuration.

Figure 16: Timing Client Admin Page—Config Pane



Stopping and Restarting the TCA6000 or TCA6500 Timing Client

The TCA6000 and TCA6500 Timing Clients can be rebooted, or a clean power down can be performed by halting all the processes running on the Timing Client. To reboot or halt the Timing Client:

1. Click the **Admin** tab.
2. Select the **Upgrade** tab at the top of the screen.
3. Click the **Reboot** or **Halt** button.
4. Click **Apply** to reboot or halt the Timing Client.

The Timing Clients provide carrier-class upgrade capability. Two flash partitions are allocated to store software images. All upgrade or downgrade images are placed in volatile RAM first, and written to the inactive flash partition. Depending on the image chosen to run on the Timing Client, the active or non-active images can be selected by selecting the image using the drop-down arrow. Once the unit has been rebooted, the new selected image will be running.

Figure 17: Timing Client Admin Page—Upgrade Pane Showing the Current Image

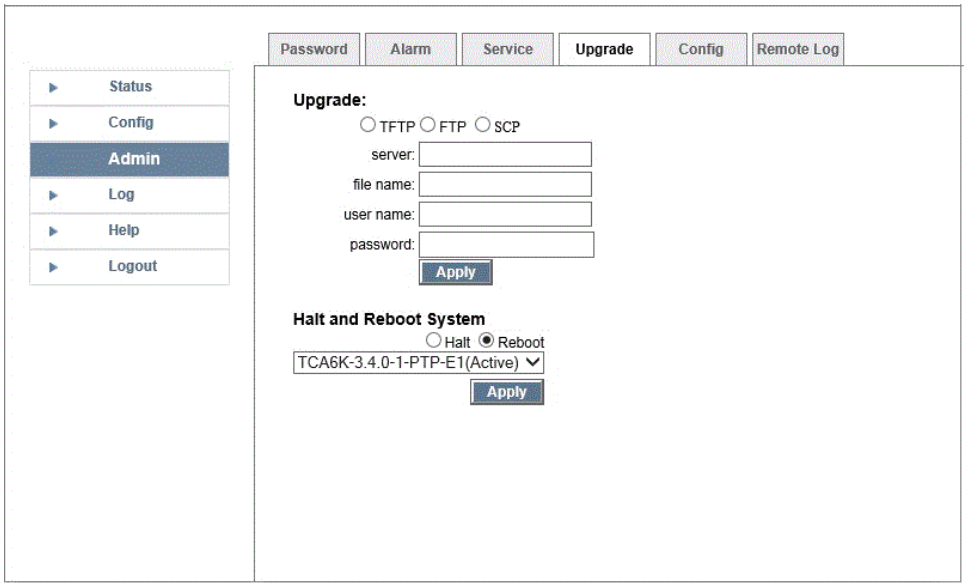
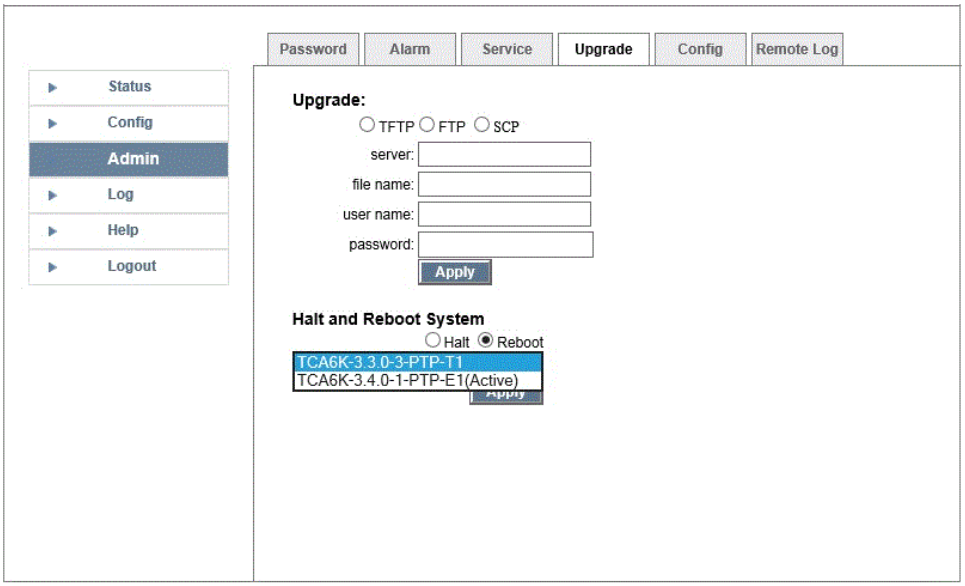


Figure 18: Timing Client Admin Page—Upgrade Pane Showing the New Image



CHAPTER 4

Upgrading the TCA6000 and TCA6500 Software

This chapter describes the processes for upgrading software on Juniper Networks TCA6000 and TCA6500 Timing Clients. The following topics are discussed:

Upgrade Requirements

The TCA6000 and TCA6500 Timing Clients are shipped with software pre-installed and ready to be configured when the Timing Client is powered on. To upgrade the software you must connect to the Timing Client using the GUI or a Telnet connection.

Upgrades affect service and cause the Timing Client to reboot. The Timing Client must reboot to load the new software version. All timing outputs are interrupted during this period (approximately 1-3 minutes). After the new version is loaded, frequency and time lock can take up to 50 minutes to resume normal status (LOCKED) for PTP features.

Gather the following information before upgrading the Timing Client:

- Admin password
- Name of the TFTP, FTP, or SCP server
- IP address of the TFTP, FTP, or SCP server
- Username and password of the FTP or SCP server
- Filename of the software upgrade or downgrade image

Selecting Between the Pre-Installed Software Images Using a GUI/Browser

The TCA6000 and TCA6500 Timing Clients ship with both T1 and E1 software images installed in the two internal non-volatile memory partitions. By default, the TCA6000

and TCA6500 Timing Clients use the E1 interface type. You can view the software images from the Timing Client Admin web interface page (see Figure 18 on page 49). The active software image is displayed as **(Active)** in the Halt and Reboot System drop-down menu.

To select an alternate software image using the Web-based GUI:

1. Verify that the Timing Client is powered on.
2. Enter the IP address of the Timing Client into a web browser.

   For example, **https://10.1.0.42**.
3. Log in to the Timing Client as **admin**.

   Login: admin

   Password: admin
4. Select the **Admin** tab from the menu on the left.
5. Select the required interface from the drop-down menu.
6. Select the **Reboot** option.
7. Click **Apply** to reboot the Timing Client.
8. Select **Yes** when prompted with the dialog box stating "Do you confirm a system reboot system?" The Timing Client reboots and loads the selected software image.

NOTE: If the appropriate software image interface is not shown in either software image partitions, upgrade the in-active partition with the appropriate software image, and then perform the reboot as described in "Upgrading the Software Using a GUI/Browser" on page 52.

Upgrading the Software Using a GUI/Browser

To upgrade the TCA6000 and TCA6500 Timing Client using the Web-based GUI:

1. Verify that the Timing Client is powered on.
2. Enter the IP address of the Timing Client into a web browser.

   For example, **https://10.1.0.42**.
3. Log in to the Timing Client as **admin**.

   Login: admin

   Password: admin
4. Select the **Admin** tab from the menu on the left.
5. Select the network protocol to be used for transferring the software upgrade or downgrade image.
   - Select **TFTP** to download the software image from the server supporting TFTP.
   - Select **FTP** to download the software image from the server supporting FTP.

- Select **SCP** to download the software image from the server supporting SCP.

6. In the **server** field, enter the IP address of the server that contains the software upgrade or downgrade image.

   For example, **10.1.0.52**.

7. In the **file name** field:

   - Enter the name of the software image file supplied by Juniper Customer Support if the image is to be downloaded from the TFTP or FTP server.

     For example, **TCA6K-3.4.0-1-PTP-E1**.

   - Enter the name of the Juniper supplied software image file with the file path if the image is to be downloaded from the SCP server.

     For example, **/build/tca/images/TCA6K-3.4.0-1-PTP-E1**.

   NOTE: Two flash partitions are allocated to store software images. These can be used to store the same images or two different images should you wish to revert to a previous version.

   All upgrade or downgrade images are written in volatile RAM first, and are loaded to the inactive flash partition. You can select active or non-active images to run on the Timing Client by selecting the image using the drop-down arrow. After the unit has been rebooted, the new—selected—image will be running on the appliance.

8. In the **user name** field, enter a valid server username.

   NOTE: The **user name** field is applicable only if the image is to be downloaded from the SCP or FTP server.

9. In the **password** field, enter the password of the server username.

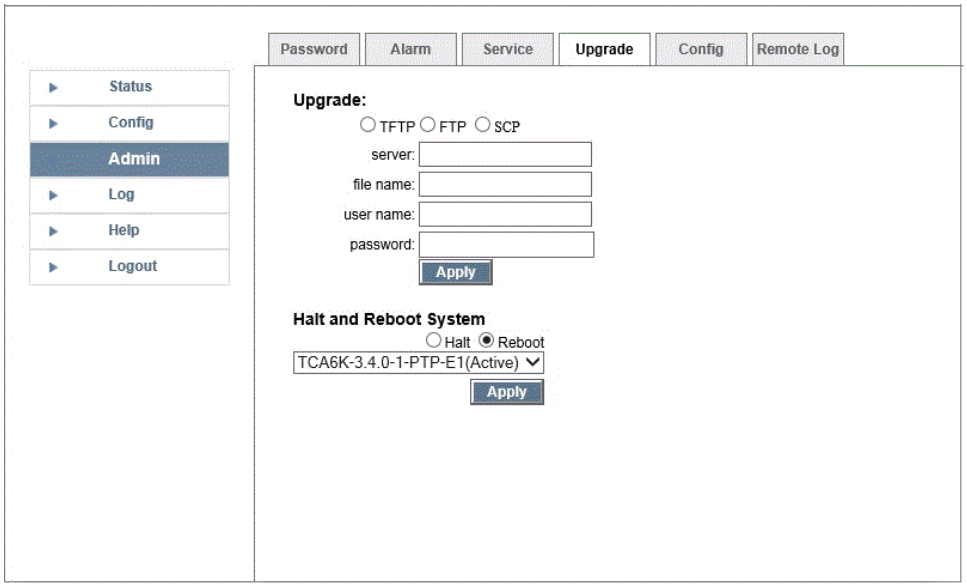
   

   NOTE: The **password** field is applicable only if the image is to be downloaded from the SCP or FTP server.

10. Select the **Apply** button. The browser status (bottom of webpage) shows the download progress. After the image file is completely downloaded (typically 1-3 minutes), a dialog box appears with the message, “Upgrade successful. The new software image will take effect after the system reboots!”
11. Select **OK** to acknowledge the upgrade message.
12. Select the **Reboot** option.

13. Click **Apply** to reboot the Timing Client.
14. Select **Yes** when prompted with the dialog box stating "Do you confirm a system reboot system?" The Timing Client reboots and loads the new software image.

Figure 19: Timing Client Admin Page—Upgrade Pane



Rebooting the Timing Client will invoke an upgrade if it completes successfully. If the upgrade fails in a detectable manner, the upgrade or downgrade image is discarded, and the Timing Client boots from the previous image. If the upgrade failed in a manner detectable only during the booting sequence, the hardware recovery cycle interrupts the process and the system reverts back to the previous image; the upgrade or downgrade image is discarded.

Selecting Between the Pre-Installed Software Images Using the CLI

The TCA6000 and TCA6500 Timing Clients ship with both T1 and E1 software images installed in the two internal non-volatile memory partitions. By default, the TCA6000 and TCA6500 Timing Clients use the E1 interface type. Use the **show partition** command to display the active and backup software images. The CLI displays the current software image as **Active**.

To select an alternate software image using the CLI:

1. Verify that the TCA6000 and TCA6500 Timing Client is powered on.
2. Connect to the Timing Client over a telnet application.

   >**telnet 10.1.0.42**
3. Enter the login and password.

   ```
   >login: admin
   Password: admin
   ```
4. Issue the **en** command, and then enter **enable** as the password.

```
>en
Password: enable
```

5. Issue the **show partition** command to verify that the software image appears in Partition 1.

```
# show partition
Partition 1: cern-2.1.2-2-PTP-E1 (Active)
Partition 2: cern-2.1.2-2-PTP-T1
```

6. To initiate the reboot, issue the **reboot *partition-number*** command where *partition-number* is the number of the partition you want to load. Type **Y** to confirm.

```
# reboot 2
Are you sure you want> to reboot? y/n

>Y
The appliance will reboot resulting in a “no service” condition.
```

NOTE: If the appropriate software image interface is not shown in either software image partitions, upgrade the in-active partition with the appropriate software image, and then perform the reboot as described in “Upgrading the Software Using the CLI” on page 55

Upgrading the Software Using the CLI

To upgrade the software using the CLI:

1. Verify that the TCA6000 and TCA6500 Timing Client is powered on.
2. Connect to the Timing Client over a telnet application.

```
>telnet 10.1.0.42
```

3. Enter the login and password.

```
>login: admin
Password: admin
```

4. Issue the **en** command, and then enter **enable** as the password.

```
>en
Password: enable
```

5. Issue the corresponding CLI command to load the software into the partition, then confirm the upgrade.

   - Issue the **tftp *tftp-ip-address filename*** command if you want to download the software image from the TFTP server.

```
# tftp 10.0.122.10 TCA6K-3.4.0-1-PTP-E1
Are you sure you want to upgrade? y/n

>Y
Please wait during file transfer...
upgrade successful!
The new software will take effective after the reboot
```

   - Issue the **ftp *ftpserverip filename username password*** command if you want to download the software image from the FTP server.

```
# ftp 10.0.122.10 TCA6K-3.4.0-1-PTP-E1 user_1 user123
```

```
Are you sure you want to upgrade? y/n

>Y
Please wait during file transfer...
upgrade successful!
The new software will take effective after the reboot
```

- Issue the **scp *username scpserverip filename*** command if you want to download the software image from the SCP server.

```
# scp user_1 10.209.164.21 /build/tca/images/TCA6K-3.4.0-1-PTP-E1
Password: ******
Are you sure you want to upgrade? y/n

>Y
Please wait during file transfer...
upgrade successful!
The new software will take effective after the reboot
```

6. Issue the **show partition** command to verify that the software image appears in Partition 1.

```
# show partition
Partition 1: TCA6K-3.4.0-1-PTP-E1
Partition 2: TCA6k-3.3.0-3-PTP-T1(Active)
```

7. Issue the **reboot 1** command to initiate the reboot, and then type **Y** to confirm.

```
# reboot 1
Are you sure you want> to reboot? y/n

>Y
The appliance will reboot resulting in a “no service” condition.
```

Rebooting the Timing Client will invoke an upgrade if it completes successfully. If the upgrade fails in a detectable manner, the upgrade or downgrade image is discarded, and the Timing Client boots from the previous image. If the upgrade failed in a manner detectable only during the booting sequence, the hardware recovery cycle interrupts the process and the system reverts back to the previous image; the upgrade or downgrade image is discarded.

PART 4

Understanding the TCA6000 and TCA6500 GUI

CHAPTER 5

Understanding the TCA6000 and TCA6500 Login Page

This chapter describes the Login page for the Juniper Networks TCA6000 and TCA6500 Timing Clients. The following topics are discussed:

Login Page Description

The Login page appears when the TCA6000 or TCA6500 Timing Client is accessed. The Login page provides information about the Timing Client configuration and other relevant details.

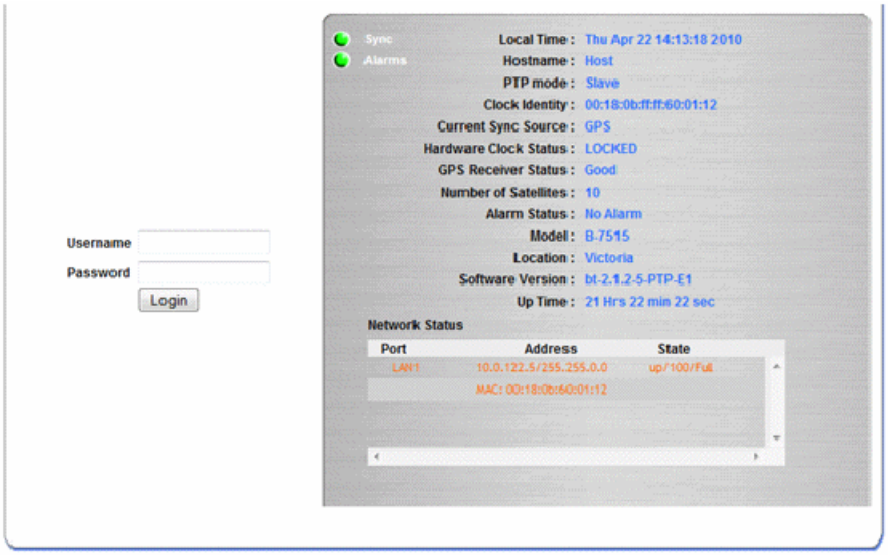
Accessing the Login Page

To access the TCA6000 or TCA6500 Timing Client Login page:

1. Open an Internet browser on a computer.
2. In the **address** field, enter the IP address that has been assigned to the Timing Client, and select Go.

   The Login page appears. See Figure 20 on page 60.

Figure 20: TCA6000 or TCA6500 Login Page



Understanding the Login Page

Table 4 on page 60 describes the elements that appear in the Login page of the TCA6000 and TCA6500 Timing Clients.

NOTE: After the Login page opens, select the Refresh button in the browser to update the page.

Table 4: Elements on the Timing Client Login Page

Element	Description
Username	Enter the name to be used as a login to the Timing Client.
Password	Enter the user password.
Login Button	Click to access the Timing Client pages.
Alarms	Indicates whether there are active alarms present on the Timing Client. • Green—Indicates that there are no active alarms on the Timing Client. • Red—Indicates that there is one or more active alarms on the Timing Client.
Local Time	The time kept by the Timing Client clock. NOTE: Click the Refresh button in the browser to update the time
Hostname	The name assigned to the Timing Client.
PTP Mode	Mode the system is operating. That is, Slave.

Table 4: Elements on the Timing Client Login Page *(continued)*

Element	Description
Clock Identity	PTP identification. Indicates the local clock identity in 64 bits UUID.
Current Sync Source	Indicates the current sync source type.
Hardware Clock Status	Indicates the synchronization status of the hardware clock. • Acquiring—Indicates in process to lock to a provisioned reference • Lock—Indicates locked to a provisional reference • Freerun—Indicates no reference is available • Holdover—Indicates in holdover state after all references are disqualified
GPS Receiver (Optional) Status	Indicates the GPS receiver status of the TCA6500 clock. States are as follows: • No GPS Time • Good—GPS receiver is tracking minimum of three satellites for position solution • No Usable Satellites • Survey-in Progress—GPS board is in self-survey mode and waiting to complete 100%. Do not move unit. • Position is Questionable—Saved stored position does not track to the GPS location while tracking present moment. • Almanac not Complete—GPS constellation information not completely downloaded. Upon initial power-on, can take up to 12.5 minutes.
Number of Satellites	Indicates the number of GPS satellites the TCA6500 Timing Client has located. All satellites may not be visible.
Alarm Status	Indicates whether there are active alarms in effect.
Model	Specifies the Juniper Networks TCA6000 or TCA6500 Timing Server model.
Location	Displays the location of the Timing Client.
Software Version	Indicates the software version of the Timing Client.
Up Time	Indicate the uptime since the most recent power up.
Network Status Window	This window provides network connection information of the Timing Client.
Port	Indicates the port the Timing Client is using.
Address	Lists the IP address assigned to the Timing Client. Lists the MAC address assigned to the Timing Client by the manufacturer.
State	Displays the status of the connection—up or down.

CHAPTER 6

Understanding the TCA6000 and TCA6500 Status Page

This chapter describes the information provided on the TCA6000 or TCA6500 Status page. The following topics are addressed:

Understanding System LEDs

The TCA6000 and TCA6500 Timing Clients have the following LEDs:

- Power (PWR)—Indicates that the Timing Client is receiving power
- Critical (CRT)—Indicates that the Timing Client has generated a CRITICAL alarm
- Major (MAJ)—Indicates that the Timing Client has generated a MAJOR alarm
- Minor (MIN)—Indicates that the Timing Client has generated a MINOR alarm
- The network Ethernet port–LAN—Has integrated Sync and Activity LEDs embedded in the RJ45 connector.

Status Page Description

The Status page provides operational and connectivity information for a TCA6000 or TCA6500.

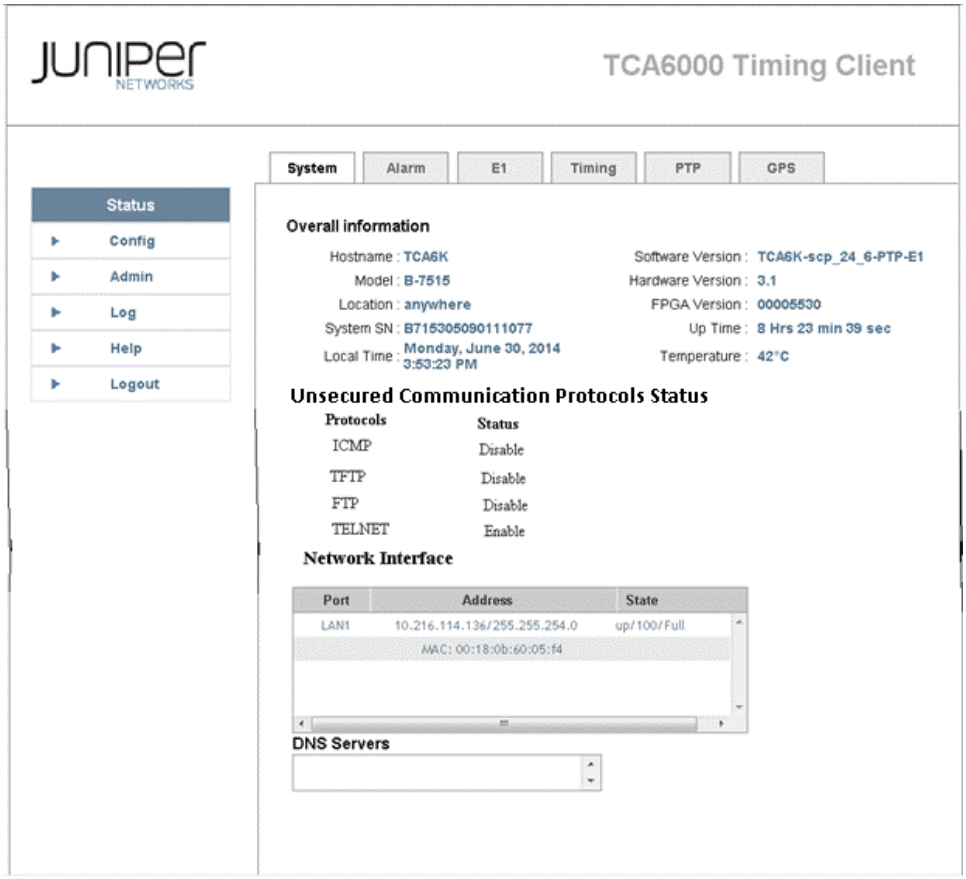
Accessing the Status Page

To access the Status page:

1. Log in to a TCA6000 or TCA6500 Timing Client.
2. Click the **Status** tab. The Status page appears. See Figure 21 on page 64.

NOTE: After the Status page opens, click the Refresh button in the browser to update the page.

Figure 21: Timing Client Status Page—System Pane



Understanding the Status Page

The Status Page—System Pane

Figure 22: Timing Client Status Page—System Pane

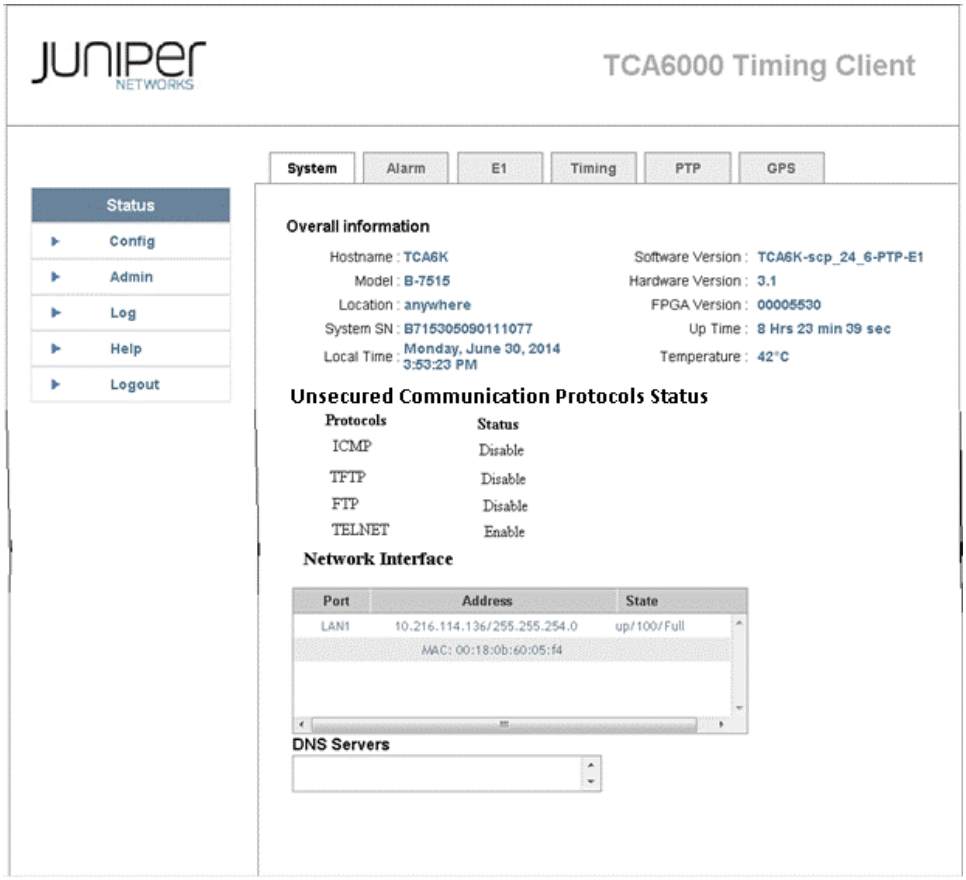


Table 5 on page 65 describes the elements that appear on the Status page—System Pane of the TCA6000 and TCA6500 Timing Clients.

Table 5: Elements on the Timing Client Status Page—System Pane

Element	Description
Overall Information Section	This section provides general information about the Timing Client.
Hostname	The name assigned to the Timing Client. You can use the admin page to assign a name to the server.
Model	The model name of your Timing Client.
Location	Indicates the physical location where the Timing Client is installed.
System SN	The serial number of the Timing Client.
Local Time	The time set on the clock of the Timing Client.

Table 5: Elements on the Timing Client Status Page—System Pane *(continued)*

Element	Description
Software Version	The version of software installed on the Timing Client.
Hardware Version	The version of the Timing Client hardware.
FPGA Version	The version of FPGA installed on the Timing Client.
Up Time	Displays how long the Timing Client has been running since the last power up.
Temperature	Shows the temperature of the Timing Client.
Unsecured Communication Protocols Status Section	**This section displays the status of unsecured transfer or communication protocols.**
Protocols	Indicates the names of unsecured transfer or communication protocols such as Internet Control Message Protocol (ICMP), Trivial File Transfer Protocol (TFTP), FTP, and Telnet protocol.
Status	Indicates whether the specific unsecured transfer or communication protocol is enabled or disabled.
Network Interface Section	**This section provides information about the Timing Client network connections.**
Port	Indicates the Timing Client port which the address and state information corresponds to.
Address	The IP address and MAC address used by the Timing Client port.
State	The connectivity state of the port with the network.
DNS Servers Window	This window lists the DNS servers the Timing Client is accessing.

The Status Page—Alarm Pane

The Alarm pane provides valuable information about the health of the system. The Alarm pane provides the necessary information to identify and analyze issues that may be caused as a result of a system problem or an issue external to the system.

Figure 23: Timing Client Status Page—Alarm Pane

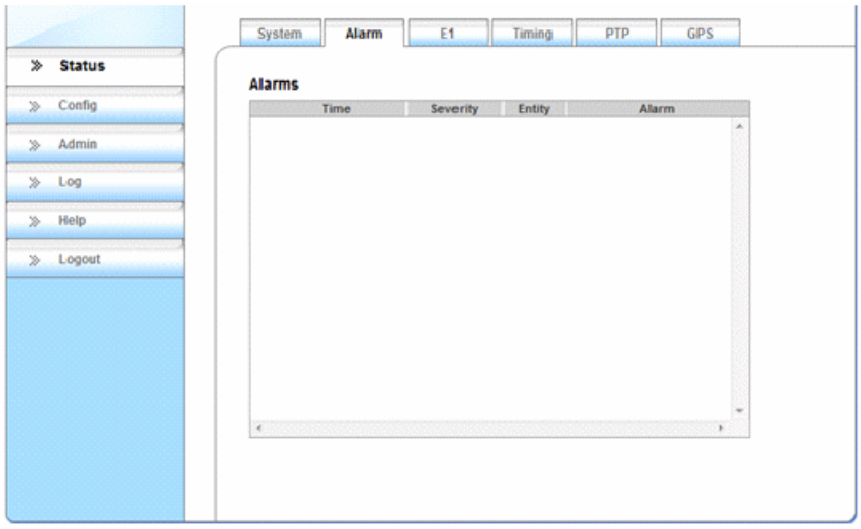


Table 6 on page 67 describes the elements that appear on the Status page—Alarm Pane of the TCA6000 and TCA6500 Timing Clients.

Table 6: Elements on the Timing Client Status Page—Alarm Pane

Element	Description
Alarms Section	This section lists the alarms the Timing Client issues.
Alarms Window	This window displays the alarms the Timing Client issues.
Time	Indicates the time an alarm occurred.
Severity	Indicates the severity of the generated alarm.
Entity	Indicates the entity this alarm is associated with. Alarms can be associated with an input/output or with the whole system.
Alarm	Describes the alarm. See Table 23 on page 102 for details.

The Status Page—E1 Pane

Figure 24: Timing Client Status Page—E1 Pane

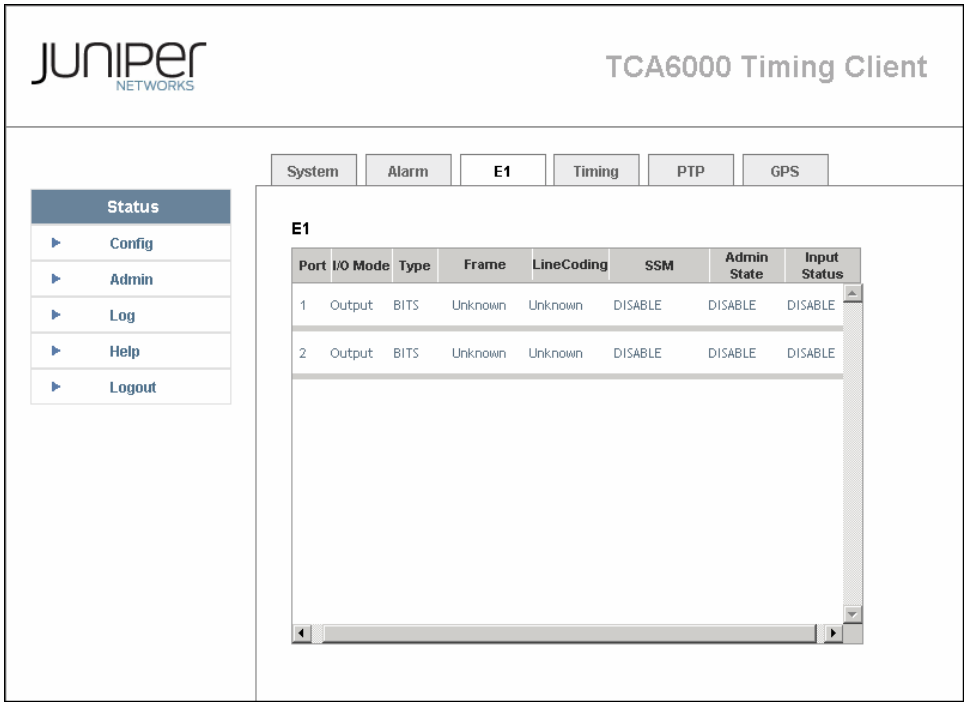


Table 7 on page 68 describes the elements that appear on the Status page—E1 Pane of the TCA6000 and TCA6500 Timing Clients.

Table 7: Elements on the Timing Client Status Page—E1 Pane

Element	Description
E1 Section	This section provides information about elements used by the Timing Client to maintain E1 parameters.
E1 Window	This section enables the setting of the E1 parameters on the Timing Client.
Port	This section indicates the E1 port number of the Timing Client.
Output Mode	Indicates the output modes of the E1 ports on the Timing Client.
Type	Indicates the type of port- BITS on the Timing Client.

Table 7: Elements on the Timing Client Status Page—E1 Pane *(continued)*

Element	Description
Frame Status	Describes the Framing Status of the E1 output ports on the Timing Client as the follows: • SF, Super-Frame • ESF, Extended Super-Frame Describes the Framing Status of the T1 input ports on the Timing Client as follows: • Normal • LFA, Loss of Frame Alignment • LMFA, Loss of Multi-Frame Alignment • RA, Remote Alarm • RAR, Remote Alarm Recovery • FAR, Frame Alignment Recovery • RRA, Receive Remote Alarm
Line Coding Status	Describes Line Coding of the E1 output ports on the Timing Client as follows: • B8ZS, Bipolar 8-Zero Substitution. Describes Line Coding of the E1 input ports on the Timing Client as follows: • Normal • LOS, Loss of Signal • LOF, Loss of Frame
SSM	Indicates the E1 Synchronization Status Message for the respective port, and describes the stratum level of the signal as follows: • E1_QUALITY_UNKNOWN • E1_REC_G_811 • E1_SSU_A • SSU_B • E1_SETS • E1_DO_NOT_USE
Admin State	Indicates the Port Administration Status in either Disable or Enable mode
Input Status	Indicates the input status of E1 output ports. NOTE: The Disable value is hard-coded for all E1 output ports. The support for displaying input status is not applicable for E1 input ports.

The Status Page—Timing Pane

Figure 25: Timing Client Status Page—Timing Pane

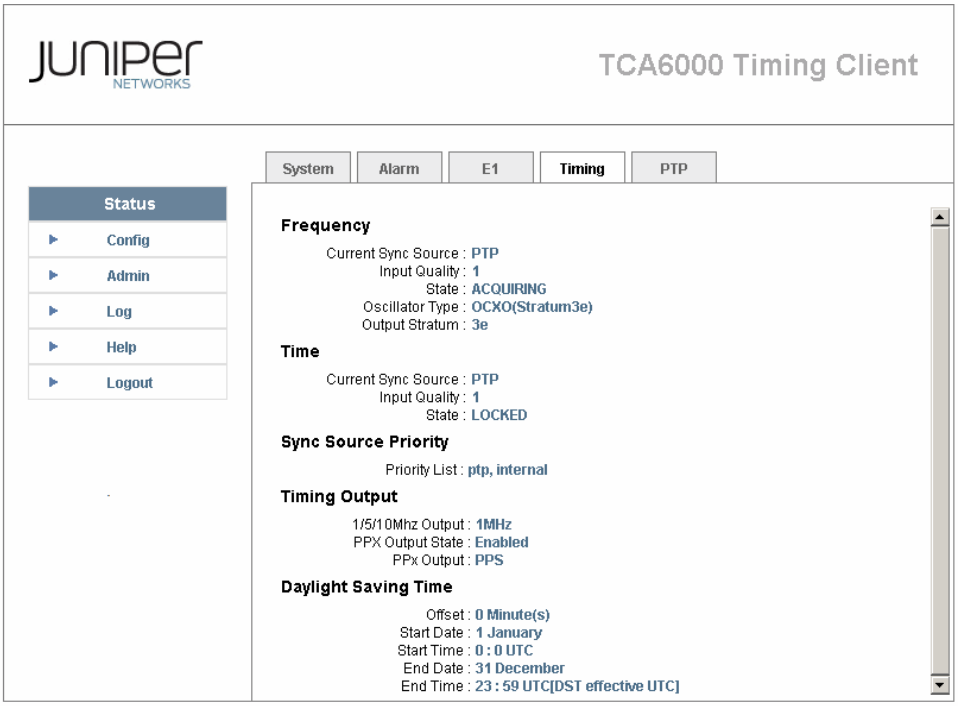


Table 8 on page 70 describes the elements that appear on the Status page—Timing Pane of the TCA6000 and TCA6500 Timing Clients.

Table 8: Elements on the Timing Client Status Page—Timing Pane

Element	Description
Frequency Section	Describes the status of frequency synchronization.
Current Sync Source	Indicates the reference source used by the Timing Client for frequency synchronization.
Input Quality	Indicates the frequency accuracy, and Stratum level (1 to 3).
State	Indicates the state of the Timing Client as a frequency source: • Acquiring—in process to lock to a provisioned reference • Lock—locked to a provisional reference • Freerun—no reference is available • Holdover—in holdover state after all references are disqualified. NOTE: Needs to be in the lock state for more than 8 hours before holdover state is qualified.
Oscillator Type	The type of oscillator installed in the Timing Client.
Output Stratum	Stratum level: 1 to 3

Table 8: Elements on the Timing Client Status Page—Timing Pane *(continued)*

Element	Description
Time Section	Describes status for timing synchronization.
Current Sync Source	Indicates the reference source used by the Timing Client.
Input Quality	Input Time accuracy, Stratum 1 to 3.
State	State of the Timing Client as a time source: • Acquiring—in process to lock to a provisioned reference • Lock—locked to a provisional reference • Freerun—no reference is available • Holdover—in holdover state after all references are disqualified
Output Stratum	Output Stratum level: 1 to 3
Synch Source Priority Section	Describes the priority of various available clock references the Timing Client uses for synchronization.
Priority List	Lists all available clock references in orders of priority for synchronization.
Timing Output Section	**Describes the configuration of the timing outputs.**
1/5/10Mhz Output	Indicates if the output frequency of the 1/5/10 MHz. output is either 1MHz, 5MHz, or 10MHz.
PPx Output	Indicates the availability of the PPx output. Available options are PPS, PPM, PPS2 or PPH.
Daylight Saving Time Section	**Describes the configuration of daylight saving time (DST).**
Offset	Indicates the configured DST offset value.
Start Date	Indicates the date and month on which the DST starts.
Start Time	Indicates the UTC time scale (in 24-hour format) at which the DST starts.
End Date	Indicates the date and month on which the DST ends.
End Time	Indicates the DST time scale (in 24-hour format) at which the DST ends.

The Status Page—PTP Pane

Figure 26: Timing Client Status Page—PTP Pane

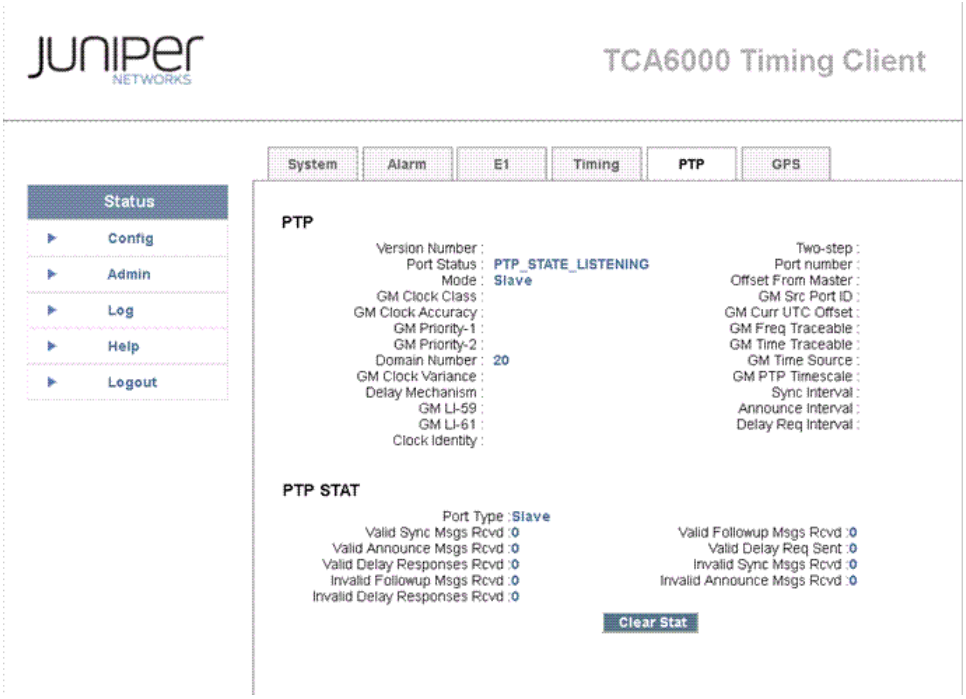


Table 9 on page 72 describes the elements that appear on the Status page—PTP Pane of the TCA6000 and TCA6500 Timing Clients.

Table 9: Elements on the Timing Client Status Page—PTP Pane

Element	Description
PTP Section	This section provides PTP information pertaining to the Timing Client.
Version Number	IEEE 1588-2008 version number.
Port Status	Indicates the current state of the PTP port. The values are: • PTP_STATE_INITIALIZING • PTP_STATE_FAULTY • PTP_STATE_DISALBED • PTP_STATE_LISTENING • PTP_STATE_PRE_MASTER • PTP_STATE_MASTER • PTP_STATE_PASSIVE • PTP_STATE_UNCALIBRATED
Mode	Indicates that the Timing Client is a PTP slave.

Table 9: Elements on the Timing Client Status Page—PTP Pane *(continued)*

Element	Description
GM Clock Class	Indicates the traceability of the time or frequency distributed by the PTP Grandmaster clock. Clock classes are defined by the IEEE 1588-2008 spec, and are used in the Best Master Clock algorithm.
GM Clock Accuracy	Indicates the clock accuracy of the PTP Grandmaster clock. Clock accuracy value is also used in the Best Master Clock algorithm.
GM Priority-1	Indicates the priority-1 value of the PTP Grandmaster clock. The values range from 0 to 255. Priority-1 value is used in the Best Master Clock algorithm.
GM Priority-2	Indicates the priority-2 value of the PTP Grandmaster clock. The values range from 0 to 255. Priority-2 value is used in the Best Master Clock algorithm.
Domain Number	Indicates the current PTP domain which the Timing Client participates in.
GM Clock Variance	Indicates the inherent precision of the PTP Grandmaster clock. Clock variance is used in the BMC (Best Master Clock) algorithm.
Delay Mechanism	Indicates the delay measurement between the Grandmaster and slave. The system supports E2E.
LI-59	Indicates the last minute of the current UTC day contains 59 seconds. This field is used during leap second correction.
LI-61	Indicates the last minute of the current UTC day contains 61 seconds. This field is used during leap second correction.
Clock Identity	Indicates the local clock identity in 64 bits UUID.
Two Steps	Indicates the option for using one step or two step functions for the PTP protocol.
Port Number	Indicates the port number of the Grandmaster the PTP communicates with.
Offset From Master	Indicates the time difference between the TCA6500 Timing Client and the PTP Grandmaster.
Parent Src Port ID	Indicates the source port ID of the Grandmaster clock.
GM Current UTC Offset	Displays the offset between TAI and UTC for the Grandmaster clock. When the Grandmaster is locked to GPS. The current value of the UTC offset is 33.
GM Freq Traceable	Shows whether the frequency determining the time scale of the Grandmaster clock is traceable to a primary standard.
GM Time Traceable	Indicates whether the timestamp of the Grandmaster clock is traceable to a primary standard.
GM Time Source	Indicates the time source currently in use by the Grandmaster clock. Available options are GPS or Internal clock.

Table 9: Elements on the Timing Client Status Page—PTP Pane *(continued)*

Element	Description
GM PTP Timescale	Displays the clock time scale of the Grandmaster clock. Available options are TRUE if it is PTP, or FALSE if not PTP.
Sync Interval	Indicates the number of sync packet per second the Grandmaster sends. Values are 1, 2, 4, 8, 16, 32 or 64 pps.
Announce Interval	Indicates how long in seconds for the Grandmaster to send the announce packet. The values are one packet per 1, 2, 4 or 8 seconds.
Delay Req Interval	Indicates the number of delay packet per second the Grandmaster sends. Values are 1, 2, 4, 8, 16, 32 or 64 pps.
PTP STAT	**This section displays the PTP statistics pertaining to the Timing Client.**
Port Type	Indicates that the port of the Timing Client is a slave.
Valid Sync Msgs Rcvd	Indicates the total number of valid synchronization messages received by the Timing Client from the PTP source.
Valid Announce Msgs Rcvd	Indicates the total number of valid announce messages received by the Timing Client from the PTP source.
Valid Delay Responses Rcvd	Indicates the total number of valid delay responses received by the Timing Client from the PTP source.
Invalid Followup Msgs Rcvd	Indicates the total number of invalid follow up messages received by the Timing Client from the PTP source.
Invalid Delay Responses Rcvd	Indicates the total number of invalid delay responses received by the Timing Client from the PTP source.
Valid Followup Msgs Rcvd	Indicates the total number of valid follow up messages received by the Timing Client from the PTP source.
Valid Delay Req Sent	Indicates the total number of valid delay requests sent from the Timing Client to the PTP source.
Invalid Sync Msgs Rcvd	Indicates the total number of invalid synchronization messages received by the Timing Client from the PTP source.
Invalid Announce Msgs Rcvd	Indicates the total number of invalid announce messages received by the Timing Client from the PTP source.
Clear Stat Button	Click to clear PTP statistics. NOTE: Read-Only users cannot clear the displayed PTP statistics.

The Status Page—GPS Pane (When GPS Option Is Connected)

Figure 27: Timing Client Status Page—GPS Pane

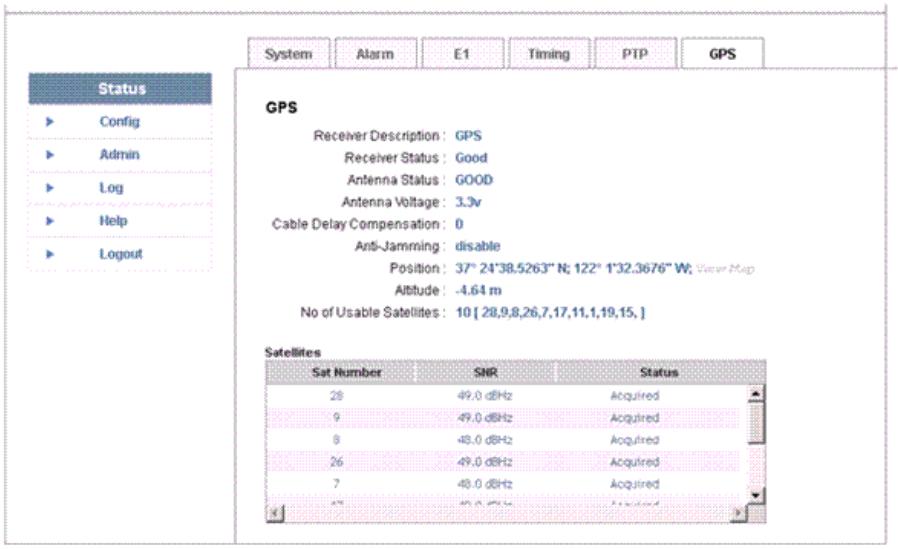


Table 10 on page 75 describes the elements that appear on the Status page—GPS Pane of the TCA6000 and TCA6500 Timing Clients.

Table 10: Elements on the Timing Client Status Page—GPS Pane

Element	Description
GPS Section	This section provides information about the GPS functionality
Receiver Description	Indicates the source that the Timing Client uses to synchronize time.
Receiver Status	Indicates the GPS receiver status of the Timing Client clock. Option states are: • Good—Receiver is functioning normally • No GPS Time. • Doing Fixes—GPS receiver is tracking minimum of three satellites for position solution • No Usable Satellites. • Survey in Progress—GPS board is in self-survey mode and waiting to complete. Do not move unit until finished. • Position is Questionable—Saved stored position does not track to the GPS location while tracking present moment. • Almanac not Complete—GPS constellation information not completely downloaded. Upon initial power-on, can take up to 12.5 minutes. • Not Tracking Satellites. • Only X usable satellite(s). • The chosen Satellite is unusable. • TRAIM rejected the fix—Timing Receiver Autonomous Integrity Monitoring, only in Timing GPS boards, will disregard satellite with highest residual range rate.

Table 10: Elements on the Timing Client Status Page—GPS Pane *(continued)*

Element	Description
Antenna Status	Indicates the condition of the connection between the Timing Client sync-server and the antenna. • Open—Electronically open. • Short—Electronically short. • Good—Electronically good.
Antenna Voltage	Indicates the antenna voltage. Available options are 3.3v or 5.0v
Anti-Jamming	Indicates whether the anti-jamming functionality of the Resolution SMT GPS Timing Receiver is enabled or disabled. NOTE: This field is visible only if the TCA6500 Timing Client uses the Resolution SMT GPS Timing Receiver.
Position	Indicates the coordinates of the Timing Client antenna.
Altitude	Indicates the height of the antenna as determined using GPS information relative to sea level.
Number of Usable Satellites	Indicates the number of satellites observed.
Satellites Section	**This window provides information about the satellites to which the Timing Client has established a connection.**
Sat Number	Indicates the number of the satellite observed.
Signal to Noise Ratio (SNR)	Indicates the strength of the satellite signal. Typical SNR value should be 4 AMU or higher.
Status	Indicates the communication status between the satellite and the Timing Client. • Acquired—Communication is established. • Never Acquired—Communication with a satellite has never been established.

CHAPTER 7

Understanding the TCA6000 and TCA6500 Config Page

This chapter describes the Config page for the Juniper Networks TCA6000 and TCA6500 Timing Clients. The following topics are addressed:

Config Page Description

The Config pages allow you to change the IP address assigned to your TCA6000 or TCA6500 Timing Client, change the sync source priority, configure T1 output ports, set SNMP access parameters, and adjust the PTP parameters to be used by the Timing Client, manage user accounts, and configure RADIUS authentication and accounting servers.

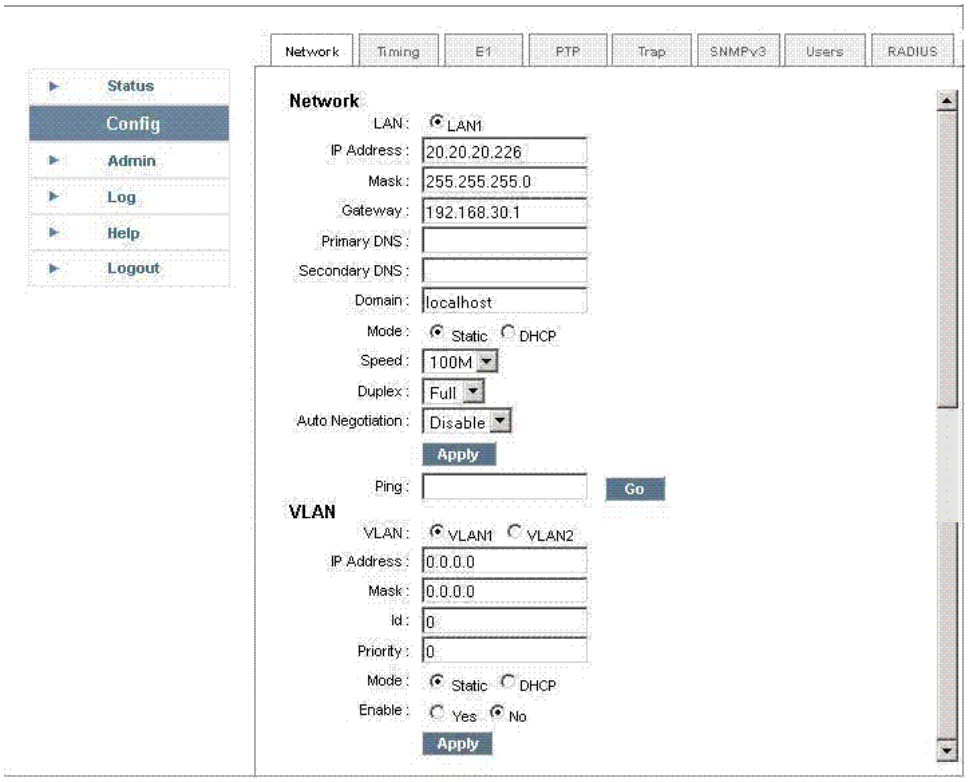
NOTE: **The Config pages are not visible to the Read-Only users.**

Accessing the Config Page

To access the TCA6000 or TCA6500 Timing Client Config page:

1. Log in to the Timing Client.
2. Click the **Config** tab. The Config page appears. See Figure 28 on page 78.

Figure 28: Timing Client Config Page—Network Pane



NOTE: After the Config screen opens, click the Refresh button in your browser. This will update the page.

Understanding the Config Page

The Config Page—Network Pane

Figure 29: Timing Client Config Page—Network Pane

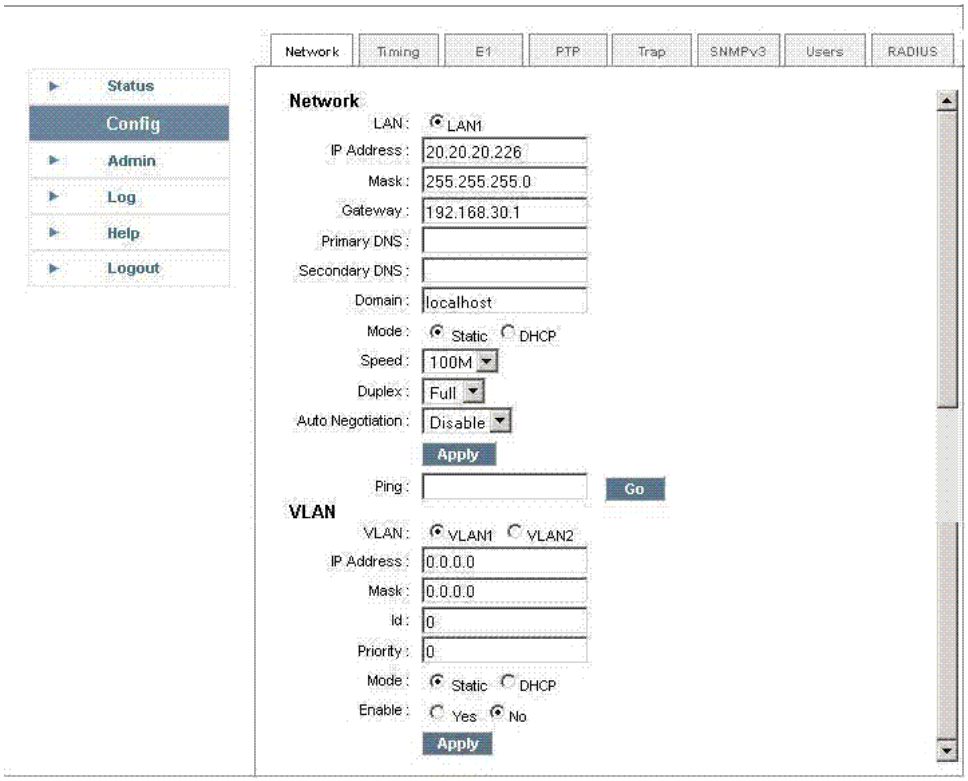


Table 11 on page 79 describes the elements that appear on the Config page—Network pane of the TCA6000 and TCA6500 Timing Clients.

Table 11: Elements on the Timing Client Config Page—Network Pane

Element	Description
Network Section	This section allows you to change the network related parameters for the Timing Client.
LAN1 Option Button	Indicates that the network setting is for LAN1.
IP Address	The IP address assigned to the selected port.
Mask	The subnet mask assigned to the selected port.
Gateway	The IP address of the gateway the Timing Client uses to communicate across the network.
Primary DNS	The IP address of the primary DNS used by the Timing Client.
Secondary DNS	IP address of the secondary DNS used by the Timing Client.
Domain	Domain name of the LAN.

Table 11: Elements on the Timing Client Config Page—Network Pane *(continued)*

Element	Description
Mode	The method used by the Timing Client to obtain an IP address. • Static—Choose this option button to manually assign an IP address. • DHCP—Select this option button if you want the DHCP server to assign an IP address to the Timing Client automatically. • **Apply** Button—Click to activate the mode you have selected.
Speed	Allows you to select either 100 Mbps or 10 Mbps for the LAN port.
Duplex	Allows you to select either full or half duplex mode for the LAN port.
Auto Negotiation	Allows you to enable or disable auto negotiation for the LAN port.
Ping	Allows you to ping a device on the network. • **Go** Button—Click this button to run the ping command.
VLAN Section	**This section allows you to configure or change the VLAN related parameters for the Timing Client.**
VLAN	Use the option button to configure or change the VLAN settings for the Ethernet port.
IP Address	Enter the IP address for the selected VLAN.
Mask	Enter the subnet mask assigned to the selected VLAN.
Id	Enter the VLAN ID ranging from 2 through 4095, which is used to identify the VLAN encapsulation packet.
Priority	Enter a priority value for the VLAN header to be used for differential services transporting the packet. This value ranges from 0 through 7.
Mode	Select a mode to be used by the Timing Client to obtain an IP address for the VLAN. • Static—Select this option to manually assign an IP address for the VLAN. • DHCP—Select this option if you want the IP address to be automatically assigned for the VLAN by using the DHCP server.
Enable	Use the option button to enable or disable VLAN encapsulation for IP packets.
Apply	Click to save and implement the changes.

The Config Page—Timing Pane

Figure 30: Timing Client Config Page—Timing Pane

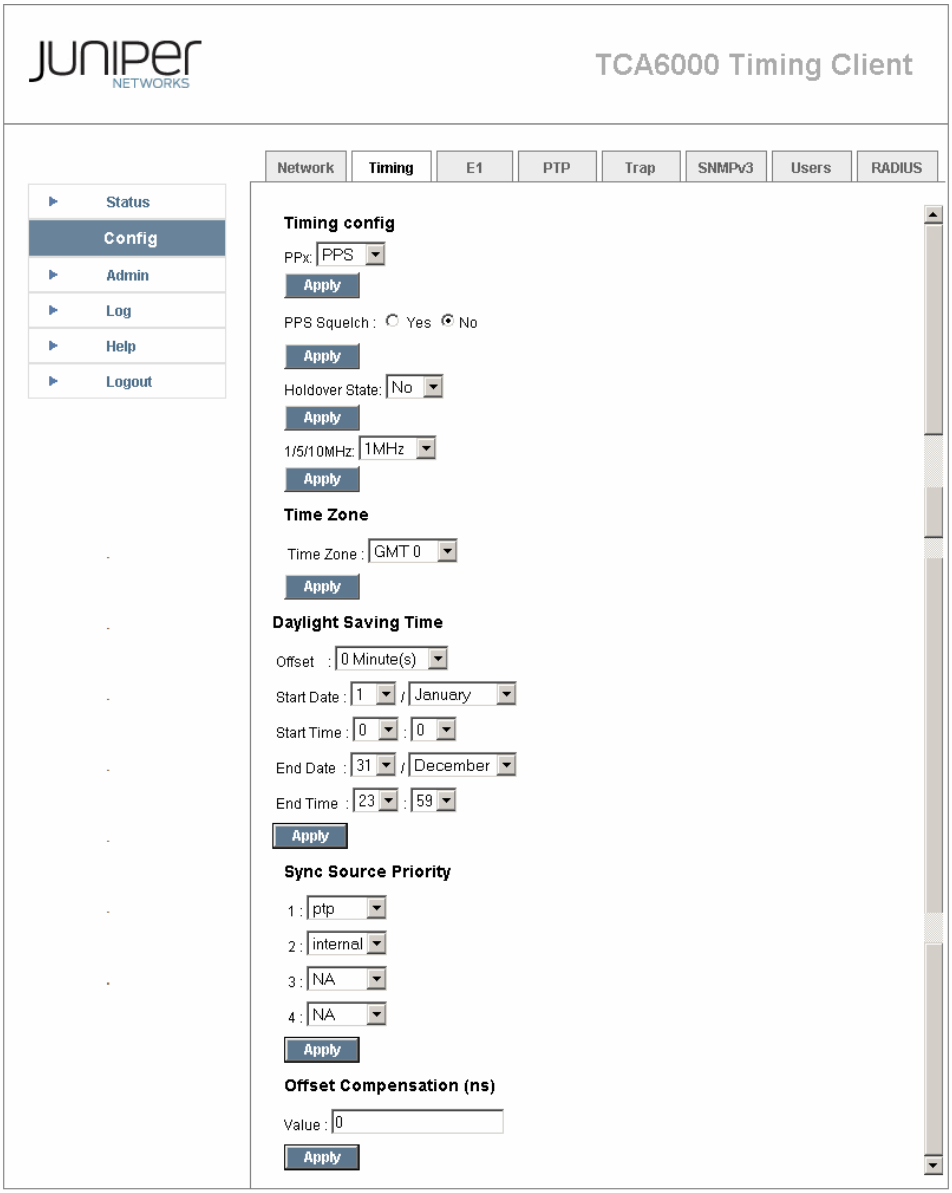


Table 12 on page 81 describes the elements that appear on the Config page—Timing pane of the TCA6000 and TCA6500 Timing Clients.

Table 12: Elements on the Timing Client Config Page—Timing Pane

Element	Description
Timing Config Section	This section allows the user to configure the timing output options on the Timing Client.

Table 12: Elements on the Timing Client Config Page—Timing Pane *(continued)*

Element	Description
PPx	Allows user to set PPS, PPS2, PPM, or PPH signal for the PPx output port. Click the **Apply** button to commit the changes.
PPS Squelch	Allows you to turn on or off the PPS squelch. • Yes—The PPS squelch is turned on, thereby disabling the PPS output when the TCA system is not locked to GPS or PTP. • No (default)—The PPS squelch is turned off, thereby enabling the PPS output even when the TCA system is not locked to GPS or PTP.
Holdover State	Allows you to set the TCA system to remain in the holdover state or change to the internal state after 24 hours of holdover state. • Yes—The system remains in the holdover state instead of changing to the internal state after 24 hours of holdover state. However, the system changes to the internal state when the signal is lost during acquisition, locking, or resetting the system. • No (default)—The system changes to the internal state after 24 hours of holdover state.
1/5/10MHz	Allows you to set the frequency of the 1/5/10 MHz output port.
Time Zone Section	Allows you to set the local time zones.
Daylight Saving Time Section	Allows you to adjust the clock for DST.
Offset	Allows you to select the time period (in minutes) to be adjusted for DST. The default value is 0 minute (that is, the DST is turned off).
Start Date	Allows you to select the date and month on which the DST starts. The default value is 1st January.
Start Time	Allows you to select the UTC time scale (in 24-hour format) at which the DST starts. The default value is 00:00 UTC (GMT).
End Date	Allows you to select the date and month on which the DST ends. The default value is 31st December.
End Time	Allows you to select the DST time scale (in 24-hour format) at which the DST ends. The default value is 23:59 DST.
Antenna Voltage	Allows you to set the antenna voltage. Available options are 3.3v or 5v.
Antenna Cable Delay Compensation (ns)	Allows you to set a delay compensation value to compensate for varying cable lengths. This value ranges from -10000 through 10000 nanoseconds. NOTE: You are advised to enter: • A negative delay compensation value to compensate the positive delay introduced by the cable. • A positive delay compensation value to advance the PPS output delay relative to the absolute value.

Table 12: Elements on the Timing Client Config Page—Timing Pane *(continued)*

Element	Description
SNR	Allows you to set the signal strength display format to be either AMU or dBHz. NOTE: This field is not visible if the TCA6500 Timing Client uses the Resolution SMT GPS Timing Receiver. The AMU is not an industry standard unit of measurement.
Synch Source Priority Section	Allows you to configure the priority of various synchronization reference sources. Available options are N/A, GPS, PTP or Internal.
Priority List	Allows you to enable a priority to be assigned to a reference source. The sync source list is arranged in orders of priority, with 1 being the highest order.
Apply	Allows you to save the current configuration and apply to memory.
AntiJamming Section	This section allows you to enable or disable the anti-jamming capability of the Resolution SMT GPS Timing Receiver. NOTE: This section is visible only if the TCA6500 Timing Client uses the Resolution SMT GPS Timing Receiver.
Anti-Jamming	Allows you to enable or disable the anti-jamming capability of the Resolution SMT GPS Timing Receiver. • Enable—Enables the anti-jamming capability of the Resolution SMT GPS Timing Receiver. • Disable—Disables the anti-jamming capability of the Resolution SMT GPS Timing Receiver.
Apply button	Allows you to save the anti-jamming configuration.

The Config Page—E1 Pane

Figure 31: Timing Client Config Page—E1 Pane

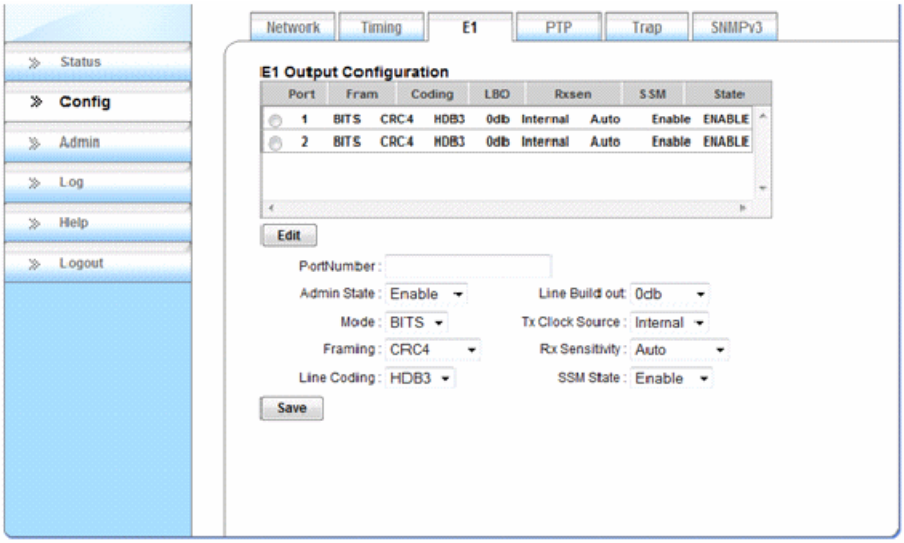


Table 13 on page 84 describes the elements that appear on the Config page—E1 pane of the TCA6000 and TCA6500 Timing Clients.

Table 13: Elements on the Timing Client Config Page—E1 Pane

Element	Description
E1 Output Configuration Section	**This windows displays the available E1 output ports and their current configuration.**
Port	Port number.
Mode	Describes E1 port mode as BITS.
Frame	• E1 Framing modes • CRC4 = Common Channel Signaling (CCS) +CRC4 • No CRC4 = Common Channel Signaling (CCS) • Channel Associated Signaling (CAS) is NOT supported
Coding	Describes E1 line coding, AMI or HDB3.
LBO	E1 Line Build Out (DB): • 0dB • –7.5dB • –15dB • –22.5dB
TxClk	Describes the Tx clock source as internal.
RxSen	Describes the Rx clock sensitivity as auto.
SSM	Describes Synchronization Status Message state. Options are Enabled or Disabled.
State	Describes admin state. Options are Enabled or Disabled.
Edit Button	Allows the user to edit the parameters of the selected output port using the pull-down manuals at the bottom of the screen.
Port Number	Allows the user to configure the port number.
Mode	Allows user to configure E1 port mode. For the current software release, only BITS is supported.
Framing	Allows user to configure E1 Framing modes: • CRC4 = Common Channel Signaling (CCS) +CRC4 • No CRC4 = Common Channel Signaling (CCS) • Channel Associated Signaling (CAS) is NOT supported
Line Coding	Allows user to configure E1 line coding. For the current software release, only HDB3 is supported.

Table 13: Elements on the Timing Client Config Page—E1 Pane *(continued)*

Element	Description
Line Build Out (LBO)	E1 Line Build Out (DB): • 0dB • –7.5dB • –15dB • –22.5dB
Tx Clock Source	Allows the user to configure Tx clock source. For the current software release, only Internal is supported.
Rx Sensitivity	Allows the user to configure the Rx Clock Sensitivity. Options are: • Auto • Short Haul • Long Haul
SSM State	Allows the user to configure Synchronization Status Message state. Options are Enabled or Disabled.

The Config Page—PTP Pane

Figure 32: Timing Client Config Page—PTP Pane

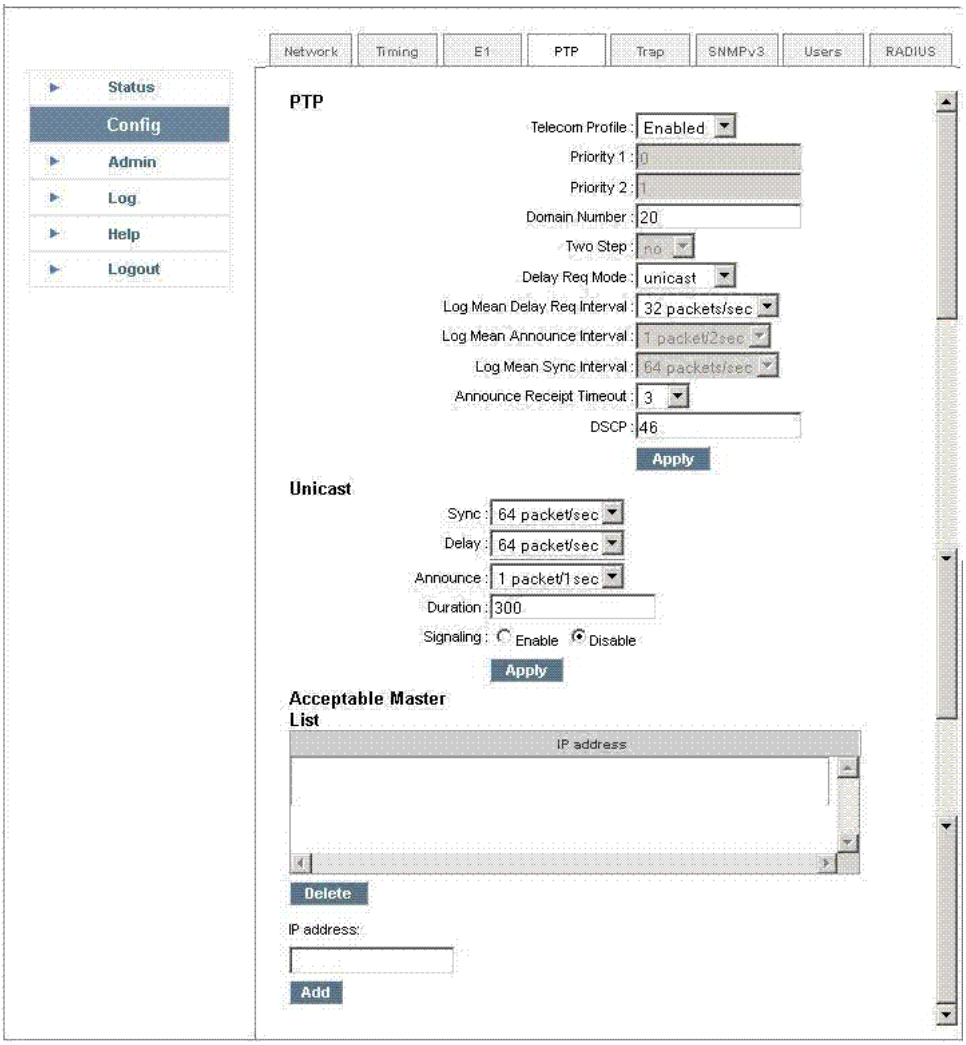


Table 14 on page 86 describes the elements that appear on the Config page—PTP pane of the TCA6000 and TCA6500 Timing Clients.

Table 14: Elements on the Timing Client Config Page—PTP Pane

Element	Description
PTP Config Section	This window lists devices with which the Timing Client has a PTP relationship
Telecom Profile	Two options are available–Enabled and Disabled
Priority 1	Field not configurable
Priority 2	Field not configurable

Table 14: Elements on the Timing Client Config Page—PTP Pane *(continued)*

Element	Description
Domain Number	Enter a value ranging between 0-254 to set the domain number associated with the network broadcast domain the Timing Client will join.
Delay Req Mode	Two options are available. Unicast or Multicast
Log Mean Delay Req Interval	Available options: 32 or 64 packets/second
Log Mean Announce Interval	Field not configurable
Log Mean Sync Interval	Field not configurable
Announce Receipt Timeout	Configurable options 2-10
DSCP	Enter the Differential Service (DiffServ) value for the IP packet. NOTE: This should be configured to Explicit Forward (EF) which is a value of 46 decimal.
Apply	Click to save the PTP configuration.
Unicast Section	**This section allows you to configure the unicast related parameters.**
Sync	Select the sync message rate that the Timing Client requests from the Grandmaster. The available options are: • **32 packet/sec** • **64 packet/sec** NOTE: It is recommended to select **64 packet/sec**.
Delay	Select the delay response message rate that the Timing Client requests from the Grandmaster. The available options are: • **32 packet/sec** • **64 packet/sec** NOTE: It is recommended to select **64 packet/sec**.
Announce	Select the announce message rate that the Timing Client requests from the Grandmaster. The available options are: • **1 packet/1 sec** • **1 packet/2 sec** • **1 packet/4 sec** • **1 packet/8 sec**
Duration	Enter the Timing Client expiration duration for sending signaling messages without receiving an acknowledgement from the Grandmaster. This value ranges from 100 seconds through 3000 seconds.

Table 14: Elements on the Timing Client Config Page—PTP Pane *(continued)*

Element	Description
Signaling	Select an option button to enable or disable the sending of signaling messages to the Grandmaster. NOTE: When reverting to profiles other than the Telecom profile, signaling needs to be disabled.
Apply	Click to save the unicast configuration.
Acceptable Master List Section	**This section allows you to add or delete the acceptable Grandmasters for the Timing Client, which is used for the Ethernet network packet IP protocol.**
Acceptable Master List Window	Displays a list of acceptable Grandmasters with their IP addresses.
Delete	Click to delete the selected Grandmaster entry.
IP Address	Enter the IP address of the acceptable Grandmaster for the Timing Client.
Add	Click to add the acceptable Grandmaster to the Timing Client.

TCA6000 and TCA6500 Timing Client Configurable Profiles

- Default Profile:
  - Supports One-step and Two-step modes
  - Process Multicast Announce/Sync/Delay Response
  - Sends Multicast Delay Request with 32 pps or 64 pps.
  - There is no Signaling/Management Packet support.
- Juniper Profile:
  - Supports One-step and Two-step modes
  - Process Multicast Announce/Sync and Unicast Delay Response
  - Sends Unicast Delay Request with 32 pps or 64 pps.
  - There is no Signaling/Management Packet support.
- Telecom Profile:
  - Supports One-step mode only
  - Process Unicast Announce/Sync and Unicast Delay Response
  - Sends Unicast Delay Request with 32 pps or 64 pps.
  - Supports Unicast Discovery and Signalling.
- You can use the Web Interface or the CLI to configure the Telecom profile with or without signalling. For more information about using the CLI, see "Using Telnet with the TCA6000 and TCA6500 Timing Clients" on page 121.

Table 15: Configuration for Each Profile

Profile	Event Message Type	Packet Type
Juniper Profile	Sync/Delay Response	Multicast
	Delay Request	Unicast
Telecom Profile	Sync/Delay Response	Unicast
	Delay Request	Unicast
Default Profile	Sync/Delay Response	Multicast
	Delay Request	Multicast

The Config Page—Trap Pane

Figure 33: Timing Client Config Page—Trap Pane

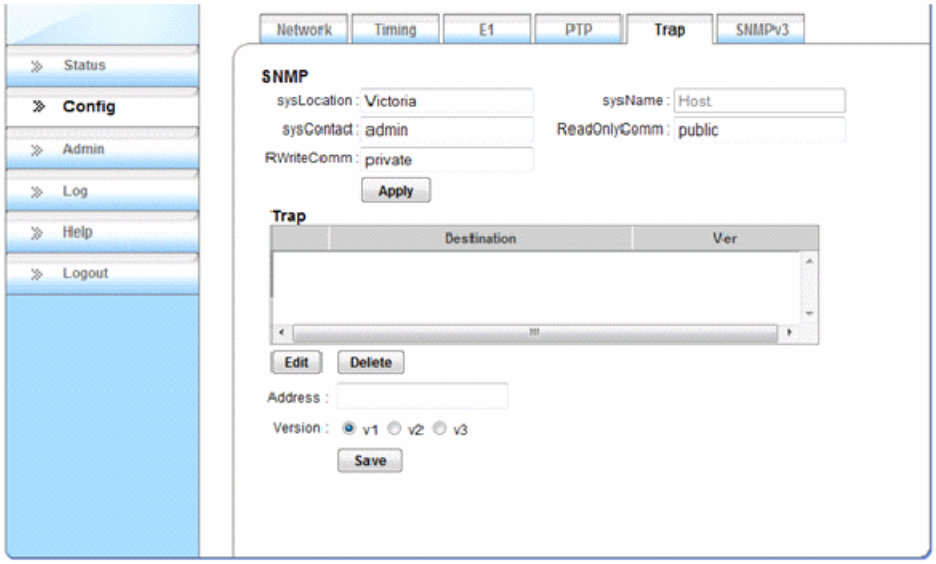


Table 16 on page 89 describes the elements that appear on the Config page—Trap pane of the TCA6000 and TCA6500 Timing Clients.

Table 16: Elements on the Timing Client Config Page—Trap Pane

Element	Description
SNMP Section	This section allows you to set the SNMP contact parameters to be used by the Timing Client.
sysLocation	Specifies the location of the Timing Client.
sysName	Provides information describing the Timing Client.

Table 16: Elements on the Timing Client Config Page—Trap Pane *(continued)*

Element	Description
sysContact	Specify contact information of the administrator assigned to manage the Timing Client.
ReadOnlyComm	Enter the command the network will use to request read community strings.
RWriteComm	Enter the command the network will use to request write community strings.
Apply Button	Click to save SNMP parameters to memory.
Trap Section	View and specify trap destinations to which the Timing Client sends alarm information.
Destination	The IP address of the trap to which the Timing Client sends SNMP data.
Ver	Version of the SNMP trap.
Edit Button	Edit the parameters of the trap destination.
Delete	Delete the trap destination.
Address	Enter the IP address of the Trap to which the Timing Client will send alarm information.
Version	Allows you to specify version of the SNMP trap.
Save Button	Save information to memory.

The Config Page—SNMPv3 Pane

Figure 34: Timing Client Config Page—SNMPv3 Pane

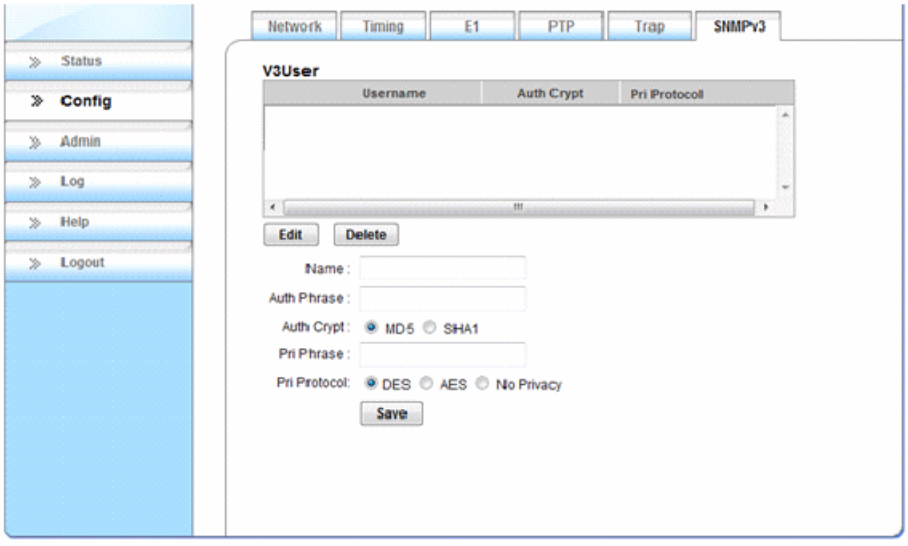


Table 17 on page 91 describes the elements that appear on the Config page—SNMPv3 pane of the TCA6000 and TCA6500 Timing Clients.

Table 17: Elements on the Timing Client Config Page—SNMPv3 Pane

Element	Description
V3 User Section	The v3 User section allows the identification of SNMPv3 users who have access to information about the Timing Client.
Username	Login name of the user.
Auth Crypt	Specifies the type of encryption a user will use to log in to the Timing Client.
Pri Protocol	Selects encryption mode on the Timing Client. Available options are DES, AES, No Privacy.
Edit	Edit the parameters for the SNMPv3 user.
Delete	Removes a user from the list.
Name	The username assigned to access the Timing Client.
Auth Phrase	Creates a unique authentication password for a user. The password must contain six or more characters.
Auth Crypt	Selects encryption type: • MD5—Use MD5 cryptographic scheme • SHA1—Use SHA1 cryptographic scheme
Pri Phrase	Creates a unique encryption privilege-phrase for messages exchanged between the user and the Timing Client.
Pri Protocol	Allows you to configure the privacy protocol for the SNMPv3 user. • DES = Use DES (Data Encryption Standard) • AES = Use AES (Advanced Encryption Standard) • No Privacy = Do not use encryption
Save Button	Save information to memory.

The Config Page—Users Pane

Figure 35: Timing Client Config Page—Users Pane

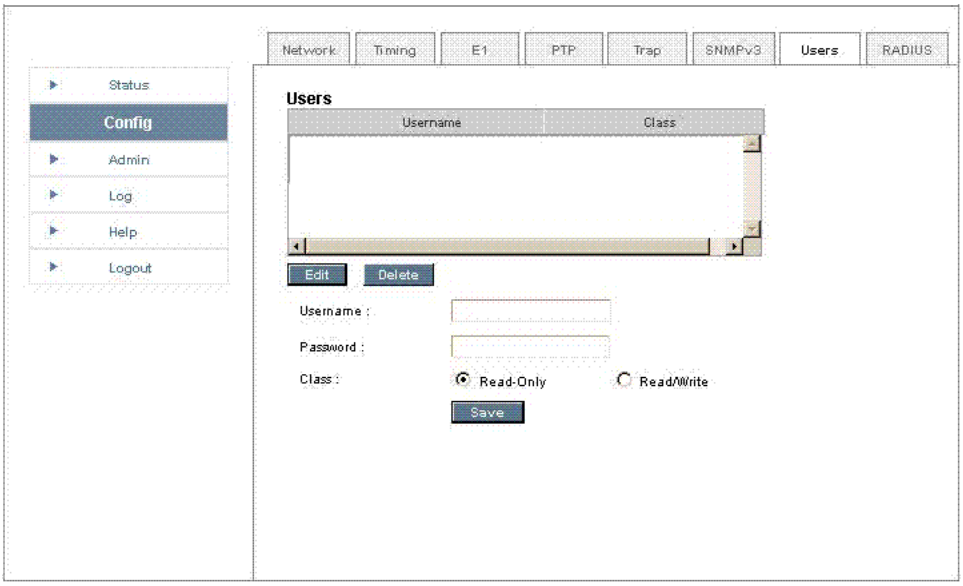


Table 18 on page 92 describes the elements that appear on the Config page—Users pane of the TCA6000 and TCA6500 Timing Clients.

NOTE: For Read/Write users, the Profile pane is available instead of the Users pane. The Users pane is visible only to the Admin user. For information about the Profile pane, see "The Config Page—Profile Pane" on page 93.

Table 18: Elements on the Timing Client Config Page—Users Pane

Element	Description
Users Section	This section allows you (Admin user) to view and configure user account details
Users Window	Displays a list of configured user accounts with their username and login class details. NOTE: • Account information of the Admin user is not displayed in this list. Only the information of the Read-Only and Read/Write users is listed. • You can create only a maximum of fiveuser accounts.
Edit Button	Click to modify the configuration details of the selected user account.
Delete Button	Click to delete the selected user account from the user account list.
Username	Enter the username for the user account. The character length ranges from 4 through 12 characters. The characters that can be used are alphanumeric and underscore (that is, _).

Table 18: Elements on the Timing Client Config Page—Users Pane *(continued)*

Element	Description
Password	Enter the password for the user account. The character length ranges from 4 through 12 characters. The characters that can be used are alphanumeric and special characters (that is, !@#$_).
Class	Select to configure the login class for the user account. The options are: • ReadOnly—User is given show view privilege. For more information, see Table 3 on page 20. • Read/Write—User is given modify privilege. For more information, see Table 3 on page 20.
Save Button	Click to save the changes.

The Config Page—Profile Pane

Figure 36: Timing Client Config Page—Profile Pane

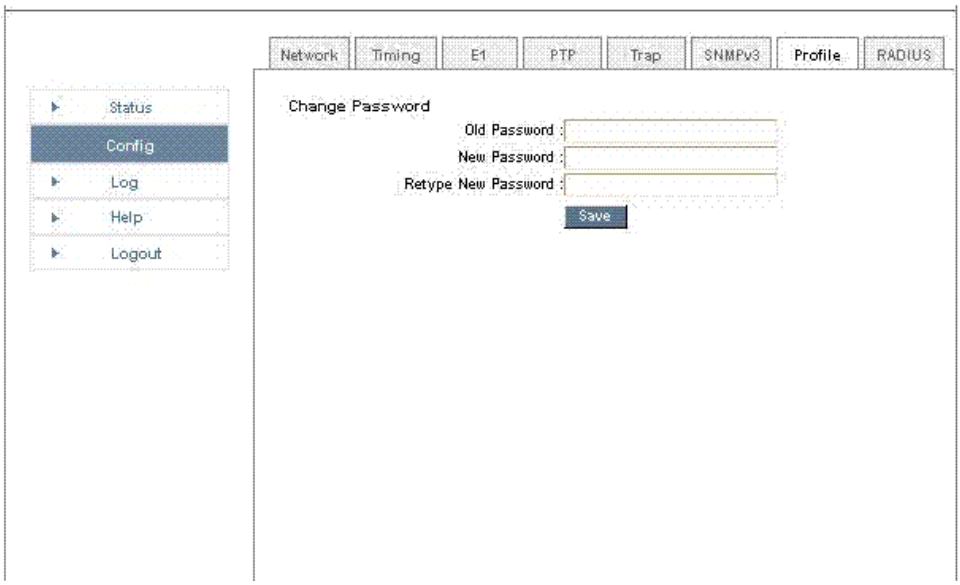


Table 19 on page 93 describes the elements that appear on the Config page—Profile pane of the TCA6000 and TCA6500 Timing Clients.

NOTE: For the Admin user, Users pane is available instead of the Profile pane. Profile pane is visible only to the Read/Write user. For information about the Users pane, see "The Config Page—Users Pane" on page 92. The password of the Admin user can be changed from the Admin page.

Table 19: Elements on the Timing Client Config Page—Profile Pane

Element	Description
Change Password Section	This section allows you (Read/Write user) to change the password for your user account.

Table 19: Elements on the Timing Client Config Page—Profile Pane *(continued)*

Element	Description
Old Password	Enter the current password.
New Password	Enter the new password to be set for your user account. The character length ranges from 4 through 12 characters. The characters that can be used are alphanumeric and special characters (that is, !@#$_).
Retype New Password	Reenter the password typed in the **New Password** field.
Save Button	Click to change your password and save the changes. NOTE: The new password will be effective from next login onwards. The current session is not affected.

The Config Page—RADIUS Pane

Figure 37: Timing Client Config Page—RADIUS Pane

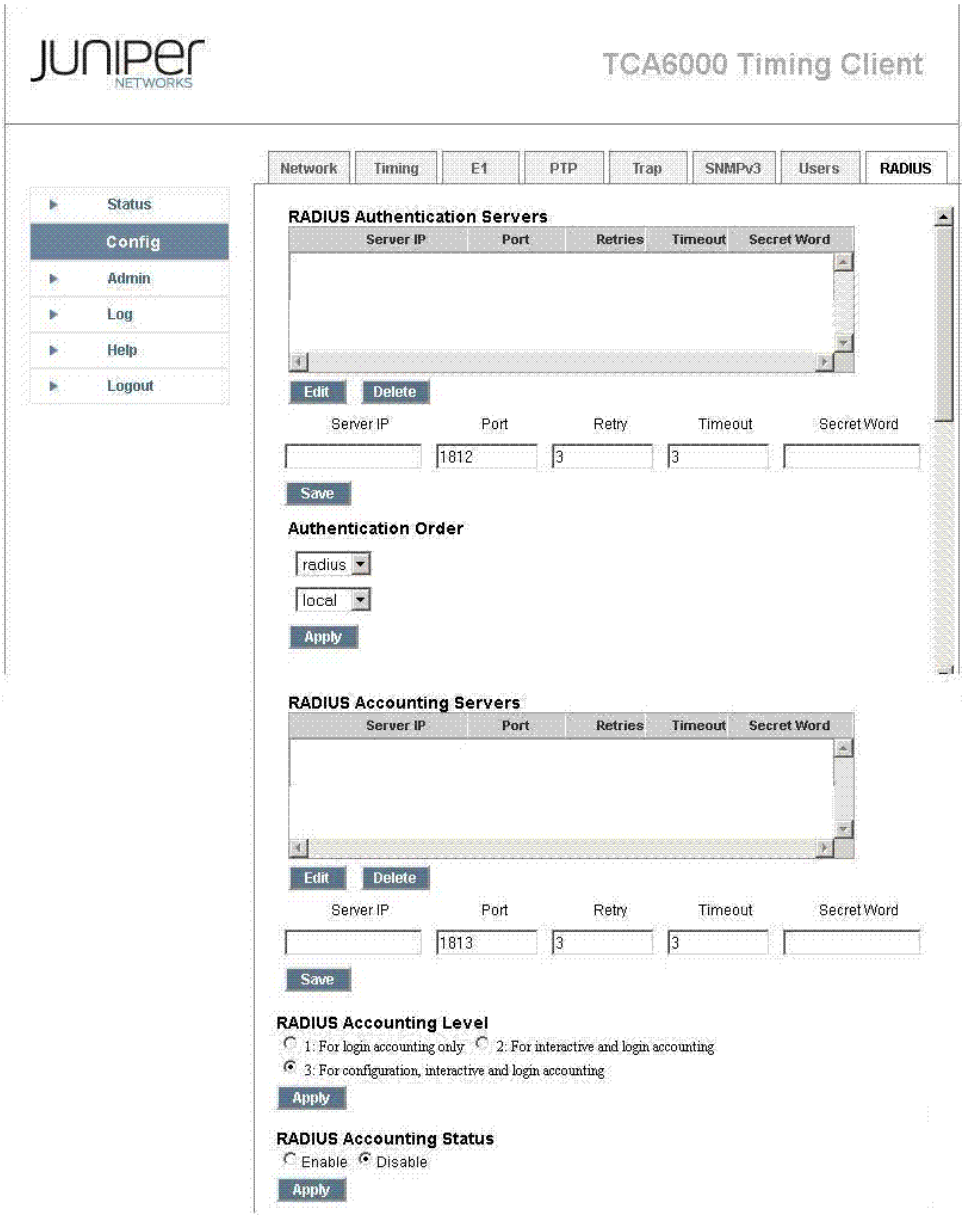


Table 20 on page 95 describes the elements that appear on the Config page—RADIUS pane of the TCA6000 and TCA6500 Timing Clients.

Table 20: Elements on the Timing Client Config Page—RADIUS Pane

Element	Description
RADIUS Authentication Servers Section	This section allows you to view and configure RADIUS authentication servers to be used by the Timing Client for user authentication.

Table 20: Elements on the Timing Client Config Page—RADIUS Pane *(continued)*

Element	Description
Radius Authentication Servers window	Displays a list of configured RADIUS authentication servers with their corresponding configuration details. NOTE: You can add only a maximum of three RADIUS authentication servers.
Edit Button	Click to modify the configuration details of the selected RADIUS authentication server.
Delete Button	Click to delete the selected RADIUS authentication server from the server list.
Server IP	Enter the IP address of the RADIUS authentication server to be used for user authentication.
Port	Enter the port through which the specified RADIUS authentication server is contacted for user authentication. The default port number is 1812.
Retry	Enter the number of attempts to be tried for contacting the specified RADIUS authentication server. The value ranges from 1 through 10. The default value is 3. When all retries fail, the Timing Client contacts the next RADIUS authentication server in the authentication server list.
Timeout	Enter the time in seconds till which the Timing Client waits for a response from the specified RADIUS authentication server. The value ranges from 1 through 90 seconds. The default value is 3 seconds. If the response is not received within the specified time period and the configured retry limit is not attained, then the Timing Client once again tries to contact the authentication server. If the response is not received within the specified time period and the configured retry limit is attained, then the Timing Client contacts the next RADIUS authentication server in the authentication server list.
Secret Word	Enter the password shared with the specified RADIUS authentication server. The character length ranges from 16 through 32 characters. The characters that can be used to define the secret word are A-Z, a-z, 0-9, and special symbols (that is, ` ! @ # $ % ^ * ( ) _ + - = { } [ ] : ; < > , . /).
Save Button	Click to save the configuration details of the RADIUS authentication server.
Authentication Order Section	This section allows you to configure the order of authentication. The default authentication order is RADIUS server authentication and then the local authentication. • radius—User is authenticated by using configured RADIUS authentication servers. • local—User is authenticated locally. NOTE: The value in the first drop box takes precedence over the value in the second drop box.
RADIUS Accounting Servers Section	This section allows you to view and configure RADIUS accounting servers to be used by the Timing Client for accounting.
Radius Accounting Servers window	Displays a list of configured RADIUS accounting servers with their corresponding configuration details. NOTE: You can add only a maximum of three RADIUS accounting servers.

Table 20: Elements on the Timing Client Config Page—RADIUS Pane *(continued)*

Element	Description
Edit Button	Click to modify the configuration details of the selected RADIUS accounting server.
Delete Button	Click to delete the selected RADIUS accounting server from the server list.
Server IP	Enter the IP address of the RADIUS accounting server to be used for accounting.
Port	Enter the port through which the specified RADIUS accounting server is contacted for accounting. The default port number is 1813.
Retry	Enter the number of attempts should be made for contacting the specified RADIUS accounting server. The value ranges from 1 through 10. The default value is 3. When all retries fail, the Timing Client contacts the next RADIUS accounting server in the accounting server list.
Timeout	Enter the time in seconds till which the Timing Client waits for a response from the specified RADIUS accounting server. The value ranges from 1 through 90 seconds. The default value is 3 seconds. If the response is not received within the specified time period and the configured retry limit is not attained, then the Timing Client once again tries to contact the accounting server. If the response is not received within the specified time period and the configured retry limit is attained, then the Timing Client contacts the next RADIUS accounting server in the accounting server list.
Secret Word	Enter the password shared with the specified RADIUS accounting server. The character length ranges from 16 through 32 characters. The characters that can be used to define the secret word are A-Z, a-z, 0-9, and special symbols (that is, ` ! @ # $ % ^ * ( ) _ + - = { } [ ] : ; < > , . /).
Save Button	Click to save the configuration details of the RADIUS accounting server.
RADIUS Accounting Level Section	This section allows you to configure the type of accounting information to be logged in the RADIUS accounting server. • 1: For login accounting only—Only the login information is sent to the RADIUS accounting server for accounting. • 2: For interactive and login accounting—The login information and interactive command details are sent to the RADIUS accounting server for accounting. • 3: For configuration, interactive and login accounting—The login information, interactive command details, and configuration command details are sent to the RADIUS accounting server for accounting. The default value is 3: For configuration, interactive and login accounting.
Apply Button	Click to activate the selected accounting level.
RADIUS Accounting Status Section	This section allows you to enable or disable RADIUS accounting in the Timing Client. • Enable—Enables RADIUS accounting. • Disable—Disables RADIUS accounting. By default RADIUS accounting is enabled.

Table 20: Elements on the Timing Client Config Page—RADIUS Pane *(continued)*

Element	Description
Apply Button	Click to activate the selected RADIUS accounting status.

CHAPTER 8

Understanding the TCA6000 and TCA6500 Admin Page

This chapter describes the Admin page for the Juniper Networks TCA6000 and TCA6500 Timing Clients. The following topics are addressed:

Admin Page Description

The Admin page allows you to perform administrative tasks and to set administrative parameters for the TCA6000 and TCA6500 Timing Clients.

NOTE: **The Admin page is visible only for the Admin user.**

Accessing the Admin Page

To access the Admin page of a TCA6000 or TCA6500 Timing Client:

1. Log in to the Timing Client.
2. Click the **Admin** tab. The Admin page appears. See Figure 38 on page 100.

NOTE: **After the Admin page opens, click the Refresh button in the browser to update the page.**

Understanding the Admin Page

- The Admin Page—Upgrade Pane on page 105
- The Admin Page—Config Pane on page 106

The Admin Page—Password Pane

Figure 38: Timing Client Admin Page—Password Pane

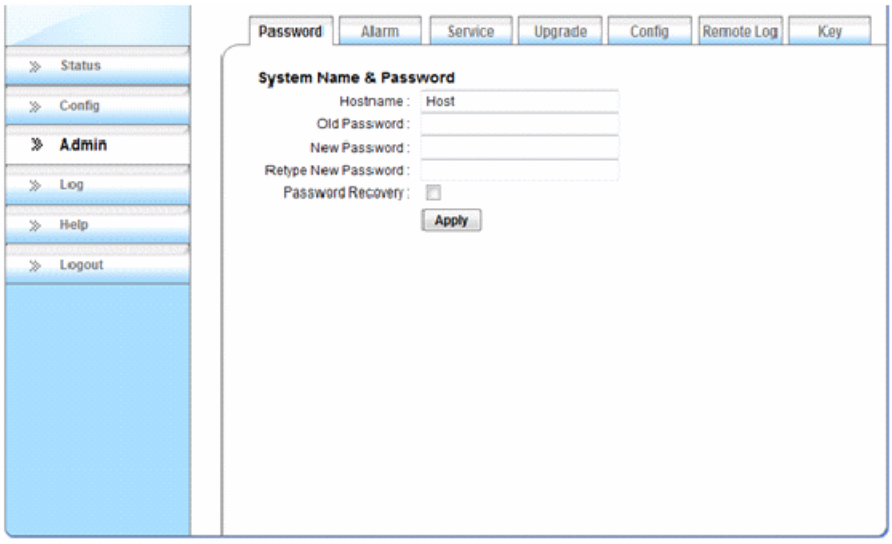


Table 21 on page 100 describes the elements that appear on the Admin page—Password pane of the TCA6000 and TCA6500 Timing Clients.

Table 21: Elements on the Timing Client Admin Page—Password Pane

Element	Description
System Name & Password Section	This section enables a name to be assigned to the Timing Client and change the login password.
Hostname	The name assigned to the Timing Client. This name is displayed on the Status page.
Old Password	Enter the current password.
New Password	Enter the new password to replace the old password.
Retype New Password	Reenter the new password to replace the old password.
Password Recovery	Reset the password to the factory default.
Apply Button	Saves the hostname and password changes to memory.

The Admin Page—Alarm Pane

Figure 39: Timing Client Admin Page—Alarm Pane

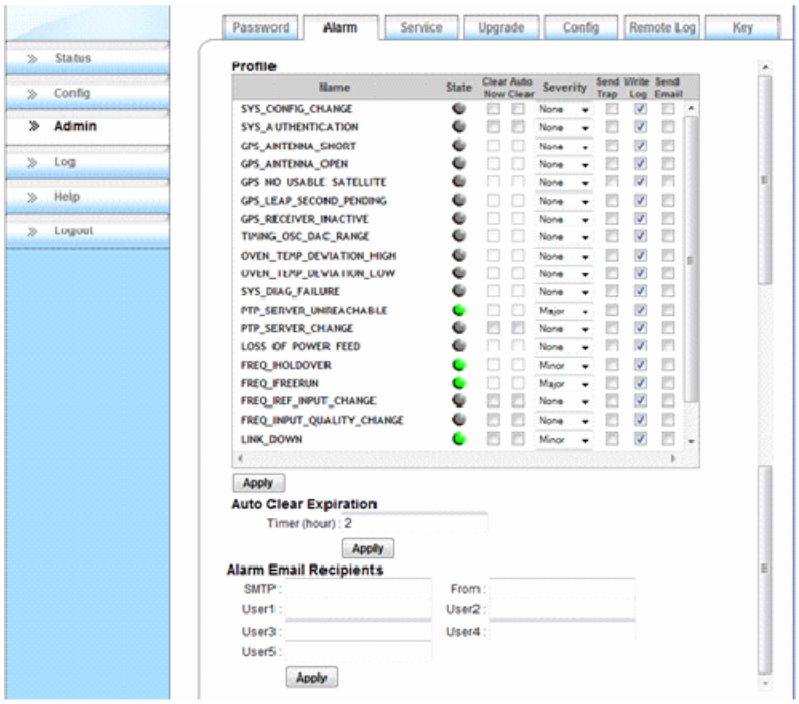


Table 22 on page 101 describes the elements that appear on the Admin page—Alarm pane of the TCA6000 and TCA6500 Timing Clients.

Table 23 on page 102 describes the alarms.

Table 22: Elements on the Timing Client Admin Page—Alarm Pane

Element	Description
System Name & Password Section	This section allows the configuration of alarms generated by the Timing Client.
Name	Name of the Timing Client alarm.
State	Indicates whether the alarm is ON or OFF.
Clear Now	Check this box to clear alarms when the **Apply** button is pressed.
Auto Clear	Check this box to clear alarms automatically after 24 hours.
Severity	Specifies the severity level of an alarm.
Send Trap	Check this box for the Timing Client to send an alarm message to trap locations.
Write Log	Check this box for the Timing Client to record the alarm in the local log file.

Table 22: Elements on the Timing Client Admin Page—Alarm Pane *(continued)*

Element	Description
Send Email	Check this box for the Timing Client to send an e-mail message of the alarm to users who have been configured to receive alarm messages.
Apply Button	Save changes to memory.
Alarm Email Recipient Section	Specifies the SMTP server to which the Timing Client will send alarm e-mail messages, and lists the recipients that will receive messages. • SMTP—Enter the domain name of the mail server. • From—Enter the from address of the outbound alarm e-mails. • User X—Enter the e-mail address of the user to whom the Timing Client will send alarm e-mail messages. • Apply—Click to save alarm e-mail recipient information to memory.

Table 23: Description of Alarm Names

Alarm Name	Description
SYS_CONFIG_CHANGE	Indicates the configuration has changed.
SYS_AUTHENTICATION	Indicates a system authentication failure.
GPS_ANTENNA_SHORT	Indicates an electrical short in the link to the GPS antenna.
GPS_ANTENNA_OPEN	Indicates an electrical open in the link to the GPS antenna.
GPS_NO_USABLE_SATELLITE	Indicates the GPS antenna is not receiving a signal from any satellite.
GPS_LEAP_SECOND_PENDING	Provides a warning of an impending leap second change.
TIMING_OSC_DAC_RANGE	Indicates that the frequency of the oscillator is out of the tuning range.
GPS_RECEIVER_INACTIVE	The GPS receiver is not active.
TIMING_OSC_DAC_RANGE	The frequency of the oscillator is outside of the tuning range.
TIMING_NON_STRATUM_ONE	The source of the timing loop is not Stratum 1 traceable.
OVEN_TEMP_RANGE_HIGH	Indicates that the secondary oscillator oven temperature is greater than the set point temperature. This is only a status indicator as there is no impact on the oscillator primary oven control or its stability. We recommend that the severity be set to NONE.
OVEN_TEMP_RANGE_LOW	Indicates that the secondary oscillator oven temperature is less than the set point temperature. This is only a status indicator as there is no impact on the oscillator primary oven control or its stability. We recommend that the severity be set to NONE.
SYS_DIAG_FAILURE	Indicates that there is a system failure reported by the system diagnostic utility.

Table 23: Description of Alarm Names *(continued)*

Alarm Name	Description
PTP_SERVER_UNREACHABLE	Indicates that the PTP server configured in the PTP association table is not reachable.
PTP SERVER CHANGE	A change in the PTP Grandmaster source selection has occurred.
LOSS_OF_POWER_FEED	Indicates that one of the two DC power feeds is not connected, or is not powered. Set alarm Severity to NONE if only one DC power feed is used.
FREQ_HOLDOVER	Indicates that the Timing Client is in holdover.
FREQ_FREERUN	Indicates that the Timing Client is in freerun.
FREQ_REF_INPUT_CHANGE	Indicates that the reference source for Timing Client has changed.
FREQ_REF_QUALITY_CHANGE	Indicates that the stratum level of the reference source for the Timing Client has changed.
FREQ_ACQUIRING	Indicates that the system tries to adjust the local oscillator based on the input source such as GPS, T1, E1, and PTP. If the adjustments are completed, then the system state is changed from acquiring state to locked state.
TIMEPROBE_DISABLE	Indicates that the time probe agent is disabled or accidentally turned off.
LINK_DOWN	Indicates that the Ethernet ports is down.
LINK_UP	Indicates that the Ethernet ports is up.
LICENSE_KEY_EXPIRE_WITHIN_60_DAYS	Indicates that the license key for a particular licensable feature is about to expire.

The Admin Page—Service Pane

Figure 40: Timing Client Admin Page—Service Pane

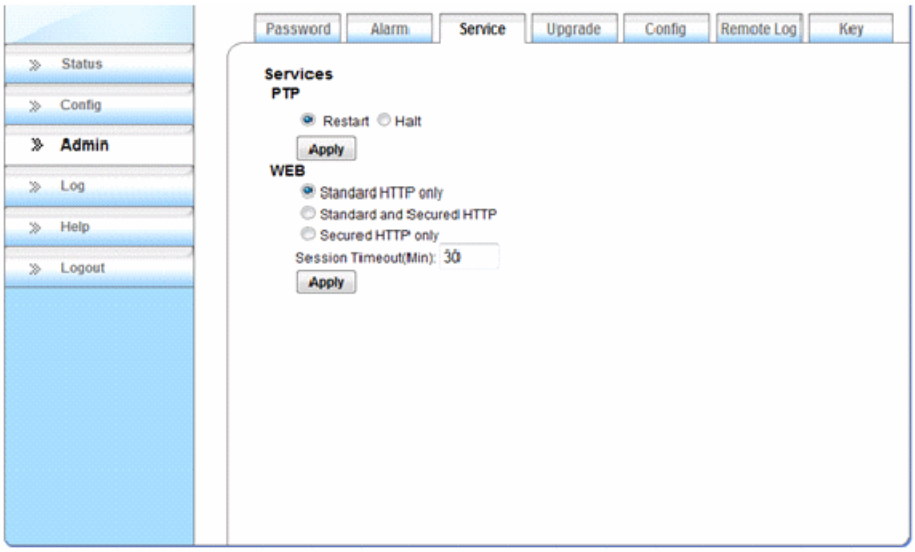


Table 24 on page 104 describes the elements that appear on the Admin page—Service pane of the TCA6000 and TCA6500 Timing Clients.

Table 24: Elements on the Timing Client Admin Page—Service Pane

Element	Description
Services Section	Understand how to configure standard or secured HTTP, set the session timeout, and either halt or restart the PTP daemon.
PTP	PTP Event Message processing for timing recovery functions. This is only used for debugging purposes. • Restart—Restart PTP operations. • Halt—Stop PTP operations. • Apply—Executes option button selection.

The Admin Page—Upgrade Pane

Figure 41: Timing Client Admin Page—Upgrade Pane

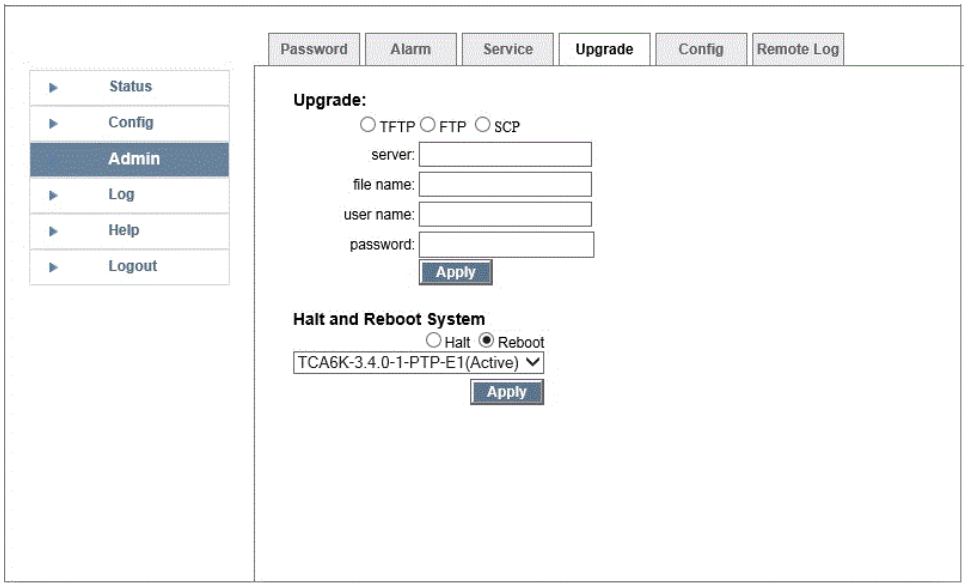


Table 25 on page 105 describes the elements that appear on the Admin page—Upgrade pane of the TCA6000 and TCA6500 Timing Clients.

Table 25: Elements on the Timing Client Admin Page—Upgrade Pane

Element	Description
Upgrade Section	This section allows you to set the details for downloading the software upgrade or downgrade image to the inactive flash partition.
TFTP	Select to download the upgrade or downgrade image from the TFTP server.
FTP	Select to download the upgrade or downgrade image from the FTP server.
SCP	Select to download the upgrade or downgrade image from the SCP server.
server	Enter the IP address of the server in which the image is located.
file name	For TFTP and FTP servers, enter the filename of the image. For SCP server, enter the filename of the image along with the full path where the file is located.
user name	Enter the username for accessing the server. NOTE: This field is applicable only for the SCP and FTP server.
password	Enter the corresponding password of the provided server username. NOTE: This field is applicable only for the SCP and FTP server.
Apply Button	Click to download the image to the inactive flash partition.

Table 25: Elements on the Timing Client Admin Page—Upgrade Pane *(continued)*

Element	Description
Halt and Reboot System Section	This section allows you to halt and reboot the Timing Client.
Halt	Select to halt the current operation of the Timing Client.
Reboot	Select to reboot the Timing Client. The pull-down menu below the option buttons displays the current software image that's active. User can also use the pull-down menu to select a different image. This new image will take effect after the system finishes rebooting.
Apply Button	Click to execute the corresponding operation.

The Admin Page—Config Pane

Figure 42: Timing Client Admin Page—Config Pane

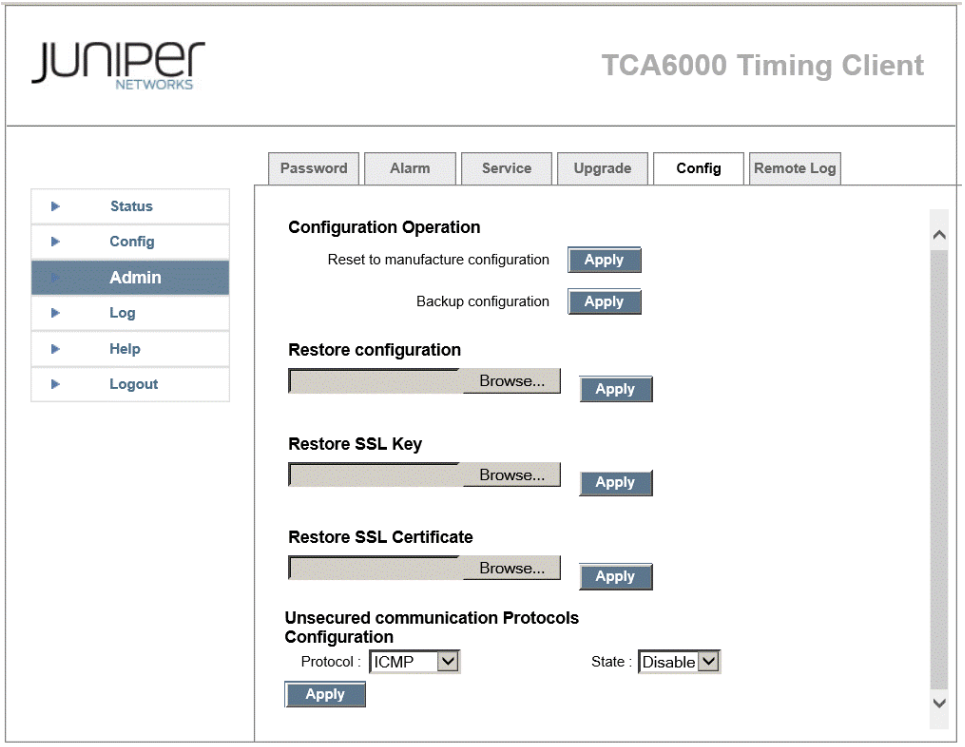


Table 26 on page 107 describes the elements that appear on the Admin page—Config pane of the TCA6000 and TCA6500 Timing Clients.

Table 26: Elements on the Timing Client Admin Page—Config Pane

Element	Description
Configuration Operation Section	Enables the backup and restore of the configuration. • Reset to manufacture configuration—Reset the current parameters to the default configuration. • Backup configuration—Backup the most recent configuration to a file. • Restore configuration—Restore the configuration from a saved file. • Locate the key file to restore. • **Apply** Button—Executes option button selection.
Restore SSL Key	Allows you to download a customized key file of **.pem** format. The file is downloaded locally without using any protocol. For more information about the dynamic SSL certificate support, see "Dynamic SSL Certificate Overview" on page 21. • **Browse** Button—Click to locate the customized key file. • **Apply** Button—Click to download the customized key file.
Restore SSL Certificate	Allows you to download a customized certificate file of **.pem** format. The file is downloaded locally without using any protocol. For more information about the dynamic SSL certificate support, see "Dynamic SSL Certificate Overview" on page 21. • **Browse** Button—Click to locate the customized certificate file. • **Apply** Button—Click to download the customized certificate file.
Unsecured communication Protocols Configuration Section	This section allows you to configure unsecured transfer or communication protocols.
Protocol	Allows you to select the unsecured transfer or communication protocol to be enabled or disabled. The available options are: • ICMP • TFTP • FTP • TELNET • ALL
State	Allows you to enable or disable the unsecured transfer or communication protocols. The available options are: • Enable—Enables the selected unsecured transfer or communication protocol. • Disable—Disables the selected unsecured transfer or communication protocol. By default, all the unsecured transfer or communication protocols (ICMP, TFTP, FTP, and Telnet protocol) are enabled.

CHAPTER 9

Understanding the TCA6000 and TCA6500 Log Page

This chapter describes the Log page of the Juniper Networks TCA6000 and TCA6500 Timing Clients. The following topics are addressed:

Log Page Description

The Log page provides data which is reported by the Timing Client during operation.

NOTE: **The Clear button appears dimmed for the Read-Only and Read/Write users, so they cannot clear the displayed log messages.**

Accessing the Admin Page

To access the Admin page of a TCA6000 or TCA6500 Timing Client:

1. Log in to the Timing Client.
2. Click the **Log** section to the left of the page. The Event Log pane appears at the top. See Figure 43 on page 110.

NOTE: **After the Log page launches, click the Refresh button in the browser to update the page.**

Understanding the Log Page

- The Log Page—AuthLog Pane on page 111
- The Log Page—Daemon Pane on page 112

The Log Page—EventLog Pane

Figure 43: Timing Client Log Page—EventLog Pane

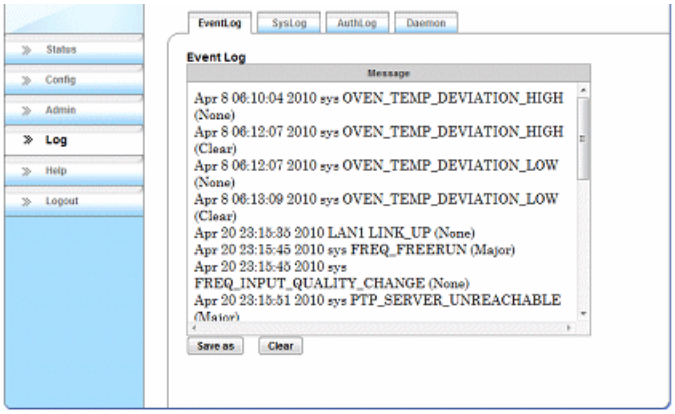


Table 27 on page 110 describes the elements that appear on the Log page—EventLog pane of the TCA6000 and TCA6500 Timing Clients.

Table 27: Elements on the Timing Client Log Page—EventLog Pane

Element	Description
EventLog	This window displays event messages reported to the Timing Client. This log is used to provide operational alarm and status of the Timing Client. • Message—Lists the event messages received. • Save as—Save the event log to a file. • Clear—Clears the log page.

The Log Page—SysLog Pane

The Syslog displays internal system level messages which indicate the operational state and status of the Timing Server software applications. Any error event that impacts the operational state of the system is reflected with the appropriate alarm event in the EventLog. For details, see "The Log Page—EventLog Pane" on page 110.

Figure 44: Timing Client Log Page—SysLog Pane

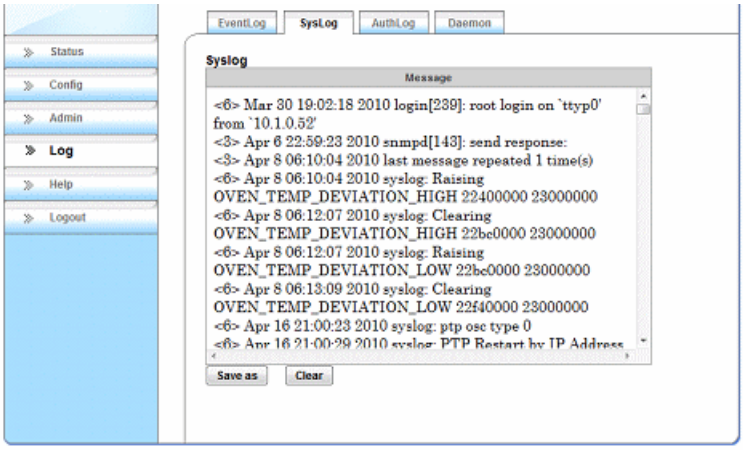


Table 28 on page 111 describes the elements that appear on the Log page—SysLog pane of the TCA6000 and TCA6500 Timing Clients.

Table 28: Elements on the Timing Client Log Page—SysLog Pane

Element	Description
SysLog	This window displays system messages reported to the Timing Client. • Message—Lists the system messages received. • Save as—Save the syslog to a file. • Clear—Clears the log page.

The Log Page—AuthLog Pane

The AuthLog pane provides a history of login events.

Figure 45: Timing Client Log Page—AuthLog Pane

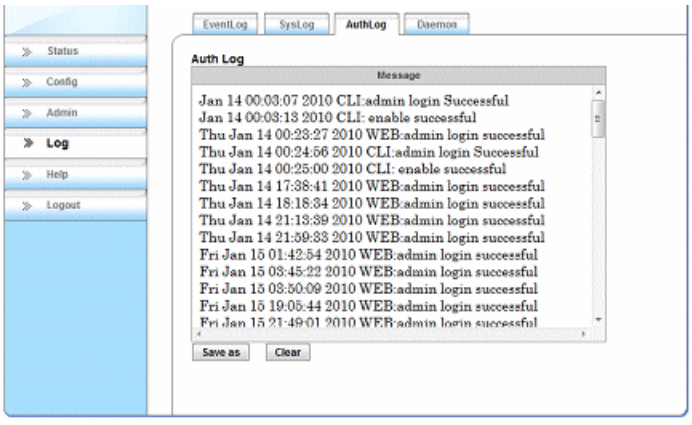


Table 29 on page 112 describes the elements that appear on the Log page—AuthLog pane of the TCA6000 and TCA6500 Timing Clients.

Table 29: Elements on the Timing Client Log Page—AuthLog Pane

Element	Description
AuthLog	This window displays authentication messages reported to the Timing Client. • Message—Lists the authentication messages received. • Save as—Save the auth.log to a file. • Clear—Clears the log page.

The Log Page—Daemon Pane

The Daemon log displays the internal operating PTP level messages which indicate the operational state and status of the PTP protocol. Any error event that impacts the operational state of the system is reflected with the appropriate alarm event in the EventLog. For details, see "The Log Page—EventLog Pane" on page 110.

Figure 46: Timing Client Log Page—Daemon Pane

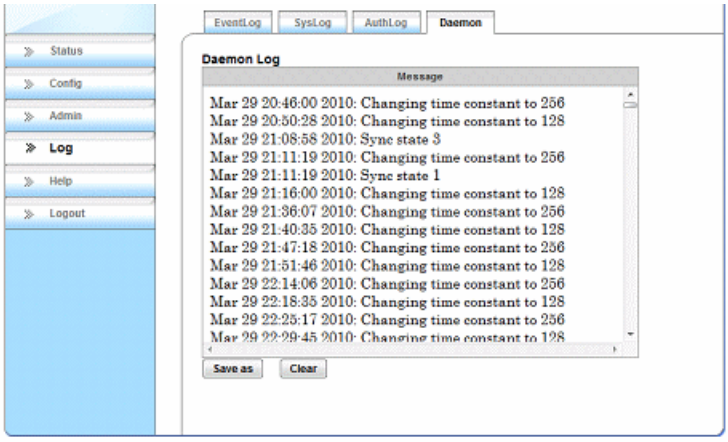


Table 30 on page 112 describes the elements that appear on the Log page—Daemon pane of the TCA6000 and TCA6500 Timing Clients.

Table 30: Elements on the Timing Client Log Page—Daemon Pane

Element	Description
Daemon.log	This window displays daemon messages reported to the Timing Client. • Message—Lists the daemon messages received. • Save as—Save the daemon.log to a file. • Clear—Clears the log page.

PART 5

Troubleshooting a TCA6000 or TCA6500 Timing Client

CHAPTER 10

Troubleshooting a TCA6000 or TCA6500 Timing Client

If you need post sales technical support, it is available through the Juniper Networks Technical Assistance Center (JTAC). For information about contacting JTAC, see "Warranty and Support" on page 163.

Event States and Alarm Types

Table 31 on page 115 shows alarms and their corresponding states.

Table 31: Event States

Alarm Condition	State
NONE	Indicates event as NONE in the Severity alarm profile.
Critical	Indicates event as Critical in the Severity alarm profile.
Major	Indicates event as Major in the Severity alarm profile.
Minor	Indicates event as Minor in the Severity alarm profile.
Clear	Indicates event alarm condition is no longer active.

Table 32 on page 115 shows alarms and their corresponding types.

Table 32: Alarm Types

Alarm	Details
Transient	Outstanding alarms are used for those time persistent condition. System will automatically raise and clear these type of alarm based on the state of the condition.

Table 32: Alarm Types *(continued)*

Alarm	Details
Static	System will raise this alarm whenever the condition occurs and hold the alarm, it require user acknowledgement and manually cleared by the administrator or by the auto clear expiration timer.

Troubleshooting the TCA6000 or TCA6500 Timing Client Using the Event Log

Use Table 33 on page 116 to identify which actions to perform when an event is reported in the event log.

Table 33: Troubleshooting the TCA6000 or TCA6500 Timing Client Using the Event Log

Event	Type	Description	Action
SYS_CONFIG_CHANGE	Static	One or more parameters were changed in the Config menu.	Verify changes were as expected.
SYS_AUTHENTICATION	Static	The was a failed Login / Password attempt in the unit.	Verify Login name and Password.
GPS_ANTENNA_SHORT	Transient	Antenna connection is shorted between the Cable Conductor Pin and Shield.	For TCA6500 only, check for a cable short on the center and ground shield.
GPS_ANTENNA_OPEN	Transient	Cable Connection has an open in it.	For TCA6500 only, check for a cable open on the center and ground shield.
GPS_NO_USABLE_SATELLITE	Transient	The antenna is unable to acquire any satellites with sufficient signal levels.	For TCA6500 only: 1. Assure the antenna has a clear view of the sky is not obstructed. For a roof antenna, find location that provides full 360-degree visibility of the horizon. 2. Validate that there is no source of high frequency interference near the antenna. Set the height of the antenna to be at least three to six feet (1-2 m) from a reflecting surface.
GPS_LEAP_SECOND_PENDING	Transient	GPS notifies of this event approximately 3 months before event.	For TCA6500 only: 1. This is a normal GPS operation which if occurs will happen either in June 30 or Dec. 31. 2. Verify event is cleared July 1 and Jan. 1, if does not clear reset unit.

Table 33: Troubleshooting the TCA6000 or TCA6500 Timing Client Using the Event Log *(continued)*

Event	Type	Description	Action
GPS_RECEIVER_INACTIVE	Transient	Internal communication to the GPS Receiver failed to respond.	For TCA6500 only: 1. Potentially the CPU has lost communication with GPS Receiver. 2. Reset unit and if it continues to occur RMA unit.
TIMING_OSC_DAC_RANGE	Transient	The Digital-to-Analog Converter (DAC) which controls the voltage adjustment for the Oscillator frequency has exceeded its range of control voltage.	Verify operational temperature is within specification of the unit.
OVEN_TEMP_DEVIATION_HIGH	Transient	Secondary oscillator Oven Temperature increase was faster than the internal oven control could compensate.	This is status only information as the internal oscillator oven temperature control will eventually compensate for this.
OVEN_TEMP_DEVIATION_LOW	Transient	Secondary oscillator Oven Temperature decrease was faster than the internal oven control could compensate.	This is status only information as the internal oscillator oven temperature control will eventually compensate for this.
SYS_DIAG_FAILURE	Transient	The boot-up System Diagnostics had one or more failures.	1. Turn power off and then back on. 2. If unit continues to show failure, the unit is defective and RMA unit for repair or replacement.
PTP_SERVER_UNREACHABLE	Transient	There is no master PTP Grand Master available in the network for the configured domain number.	1. Check domain number should match with the Grand Master domain number. 2. Check network for support of multicast packets. 3. Verify Ethernet connection is functioning properly for unit.
PTP_SERVER_CHANGE	Static	A Best Master selection has occurred and the server was changed.	Verify the "other" master had an abnormal event that caused this event.
LOSS_OF_POWER_FEED	Transient	One of the DC inputs has no voltage connected.	1. Check cables. 2. If only one power feed being used disable alarm in Admin > Alarms and configure to “NONE”

Table 33: Troubleshooting the TCA6000 or TCA6500 Timing Client Using the Event Log *(continued)*

Event	Type	Description	Action
FREQ_ACQUIRING	Transient	System tries to adjust the local oscillator based on the input source such as GPS, T1, E1, and PTP. If the adjustments are completed, then the system state is changed from acquiring state to locked state.	This is a positive indication of sync source availability.
FREQ_HOLDOVER	Transient	Local Oscillator is in Holdover state. There is no configured servers sync sources available. Only goes to this state after a sync source has been qualified for a period of time and than is not available.	Check sync source quality which was configured in the sync source table.
FREQ_FREERUN	Transient	Local Oscillator is in Freerun state. The unit has not obtained initial lock sync lock state and is operating on the local oscillator.	1. Check sync source table is configured for at least one source available. If not locked with a period of time (ex. >2 hours) reboot system. 2. Verify the PTP verify PTP state is slave. 3. Verify network connections and activity. 4. This could be caused by unit not initially being locked for a period long enough to generate a holdover value. Verify the unit has been locked for 8 hours or more.
FREQ_REF_INPUT_CHANGE	Static	The reference input being used as a sync source has changed.	Verify one of the reference input such as GPS, external inputs has changed.
FREQ_INPUT_QUALITY_CHANGE	Static	The timing input quality has changed due to lower or higher quality level of the new sync source.	Verify the quality states changes were as expected.
LINK_DOWN	Static	Ethernet connection is not functional.	Verify Ethernet connection, cables, and so on.
LINK_UP	Static	Ethernet connection is functional.	This is a positive indication of the Ethernet link status. To suppress go to Configure Admin > Alarm > Severity and set to NONE.
TIMEPROBE_DISABLE	Transient	The time probe agent is disabled or accidentally turned off.	Start or enable the time probe agent using the **restart timeprobe-agent** command.

PART 6

Appendixes

APPENDIX A

Using Telnet with the TCA6000 and TCA6500 Timing Clients

Use Telnet to access the Juniper Networks TCA6000 or TCA6500 Timing Client to configure and set operating parameters. This appendix addresses the following topics:

Accessing the Timing Client Using the CLI

To access a TCA6000 or TCA6500 Timing Client using the CLI:

1. On a computer which is on the same network segment as the Timing Client, click the **Start** button and choose **Run** from the menu. The Run dialog box appears.
2. In the **Open** field, enter the following:

   telnet *ip address*

   NOTE: If you are accessing the Timing Client for the first time, see "Assigning an IP Address to the TCA6000 or TCA6500 Timing Client" on page 13 for information about connecting to the unit and accessing the user interface.

3. Click the **OK** button.
4. A DOS window appears.
5. At the User name prompt, type the username and press Enter.
6. At the Password prompt, type the corresponding password and press Enter.

NOTE: To see a list of the commands you can use, type **help**. Refer to Table 34 on page 124 for a list of viewing options and Table 35 on page 128 for a list of configurable elements.

Changing the IP Address of the Timing Client using the CLI

The Timing Client is assigned a default IP address by the manufacturer to allow access to the unit for the first time. The IP address should be changed prior to installing on a network. See "Reserving an IP Address for the TCA6000 or TCA6500 Timing Client" on page 10 for additional information on how to reserve an IP address for the Timing Client. This section describes how to connect the Timing Client to a computer and how to use the CLI to change the IP address.

To use the CLI to change the default IP address of the Timing Client:

1. Using the computer which is connected to the Timing Client, click the **Start** button and choose **Run** from the menu. The Run dialog box appears.
2. In the **Open** field, enter the following:

   telnet 192.168.0.75
3. Click the **OK** button.
4. A DOS window appears
5. At the User name prompt, type the username and press Enter.
6. At the Password prompt, type the corresponding password and press Enter.
7. At the prompt, type **enable** and press Enter.
8. At the password prompt, type **enable** and press Enter.
9. At the prompt, type **config eth0/1ip** and press Enter.
10. At the IP address prompt, enter the IP address to be assigned to the unit and press Enter. The current IP address is shown in the brackets <>.
11. At the prompt, type **exit**, save your changes, and exit enable mode or type **help** to view additional commands.

Resetting the Passwords of Both Admin User Account and Enable Mode to Factory Defaults

You can reset passwords of the Admin user account and the enable mode to factory defaults through the CLI, GUI, or by resetting the Timing Client. For more information about resetting passwords through GUI, see "Changing/Resetting the Login Password for Admin User" on page 24.

NOTE: Only the Admin user can reset passwords through the CLI command.

To reset passwords through CLI:

1. Login as **admin**.
   a. >**admin**<cr>
   b. >password: **admin123**<cr>
2. Enable privileged commands.
   a. >**enable**<cr>
   b. >password: **enable123**<cr>
3. Execute the following command to reset Admin user and enable mode passwords:

   # reset password

You can reset passwords of the Admin user and the enable mode without logging in to the Timing Client by resetting the Timing Client.

NOTE:

- When you reset the Timing Client, only passwords of the Admin user and the enable mode are reset whereas the existing configurations are retained.
- We recommend that you reset passwords by resetting the Timing Client only when you forget Admin user account password.

To reset the Timing Client:

1. Press the pin-hole reset pin.

   NOTE: The pin-hole reset pin is available on the left side of the craft port placed in the front panel of the Timing Client.

2. Power off the Timing Client.
3. Power on the Timing Client.

Using the CLI to View Status and Configuration Parameters

The CLI can be used to view the status of Timing Client operations and to view current parameter settings. This section describes the options that are available for viewing and how to view them.

- Options That You Can View in the CLI on page 124
- Viewing an Option in the CLI on page 128

Options That You Can View in the CLI

To list the options that can be viewed, type help after the CLI session has started. Table 34 on page 124 lists the options that can be viewed.

Table 34: CLI Viewing Options

Command	Description	Supported Users
enable	Turns on privileged commands	• Admin • Read/Write
exit	Exits from current mode	• Admin • Read/Write • Read-Only
help	Displays available list of commands	• Admin • Read/Write • Read-Only
history	Displays a list of previously run commands	• Admin • Read/Write • Read-Only
logout	Disconnect	• Admin • Read/Write • Read-Only
quit	Disconnect	• Admin • Read/Write • Read-Only
show 1/5/10MHz	Displays 1/5/10 MHz settings	• Admin • Read/Write • Read-Only
show accounting-level	Displays the type of information to be accounted	• Admin • Read/Write • Read-Only
show accounting-server	Displays the details of the configured RADIUS accounting servers	• Admin • Read/Write • Read-Only
show accounting-status	Displays the current status of RADIUS accounting	• Admin • Read/Write • Read-Only
show alarm all	Displays all active alarms	• Admin • Read/Write • Read-Only

Table 34: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show alarm-email-receiver	Displays alarm's e-mail receivers	• Admin • Read/Write • Read-Only
show alarm-profile	Displays alarm's profile information	• Admin • Read/Write • Read-Only
show alarm t1	Displays only T1 active alarms	• Admin • Read/Write • Read-Only
show all-configuration	Displays the current configurations of the TCA system NOTE: Only the configurations available in the **config.dat** file are displayed with appropriate fields.	• Admin • Read/Write • Read-Only
show auth-order	Displays the configured authentication order	• Admin • Read/Write • Read-Only
show authlog	Displays authorization log {num of lines}	• Admin • Read/Write • Read-Only
show cli-banner	Displays the customized CLI banner	• Admin • Read/Write • Read-Only
show daemonlog	Displays daemon log {num of lines}	• Admin • Read/Write • Read-Only
show dst-config	Displays the configured offset, starting date and time, and ending date and time for DST	• Admin • Read/Write • Read-Only
show eventlog	Displays event log {num of lines}	• Admin • Read/Write • Read-Only
show frequency	Displays frequency status	• Admin • Read/Write • Read-Only

Table 34: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show gps	Displays GPS software and hardware status	• Admin • Read/Write • Read-Only
show holdover-state	Indicates whether the TCA system remains in the holdover state or changes to the internal state after 24 hours of holdover state	• Admin • Read/Write • Read-Only
show network	Displays network information	• Admin • Read/Write • Read-Only
show partition	Displays partition information	• Admin • Read/Write • Read-Only
show pps-squelch	Displays the status of the PPS squelch	• Admin • Read/Write • Read-Only
show ppx	Displays PPS settings	• Admin • Read/Write • Read-Only
show ptp config	Displays PTP configuration	• Admin • Read/Write • Read-Only
show ptp default-dataset	Displays the PTP parameter including domain number that is configured	• Admin • Read/Write • Read-Only
show ptp parent-dataset	Displays Grandmaster priority settings and other Grandmaster parameters	• Admin • Read/Write • Read-Only
show ptp stat	Displays PTP statistics	• Admin • Read/Write • Read-Only
show ptp status	Displays PTP status	• Admin • Read/Write • Read-Only

Table 34: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show radius-server	Displays the details of the configured RADIUS authentication servers	• Admin • Read/Write • Read-Only
show session	Displays session information	• Admin • Read/Write • Read-Only
show snmp	Displays SNMP configuration information	• Admin • Read/Write • Read-Only
show snmp-trap	Displays information about trap receivers	• Admin • Read/Write • Read-Only
show snmp-v3 user	Displays SNMPv3 user information	• Admin • Read/Write • Read-Only
show sync-src-priority	Displays time status	• Admin • Read/Write • Read-Only
show sysinfo	Displays system information	• Admin • Read/Write • Read-Only
show syslog	Displays system log {num of lines}	• Admin • Read/Write • Read-Only
show t1 config	Displays T1 port configuration	• Admin • Read/Write • Read-Only
show t1 status	Displays T1 status	• Admin • Read/Write • Read-Only
show time	Displays time status	• Admin • Read/Write • Read-Only
show time-probe	Displays status of licensable features such as time probe agent	• Admin • Read/Write • Read-Only

Table 34: CLI Viewing Options *(continued)*

Command	Description	Supported Users
show timing-output	Displays timing output information	• Admin • Read/Write • Read-Only
show unsecured-communication-protocols-status	Displays the status of unsecured transfer or communication protocols such as ICMP, TFTP, FTP, and Telnet protocol.	• Admin • Read/Write • Read-Only
show user-history	Displays command history for users. NOTE: The Read-Only or Read/Write users can use this command to view only command history of their sessions. The Admin user can use this command to view command history of all users.	• Admin • Read/Write • Read-Only
show users	Displays details (username and class) of Read-Only and Read/Write users.	Admin

Viewing an Option in the CLI

To look at an option in the CLI:

1. Launch a Telnet session.
2. At the prompt, type **show *option*** and then press Enter. (Where *option* is the option that you want to view.) Information for the option is displayed.

Using the CLI to Configure Timing Client Parameters

The CLI can be used to configure the Timing Client. This section identifies and describes the element that can be configured using the CLI and describes how to configure parameters using Telnet.

- Elements that You Can Configure in the CLI on page 128
- Using the CLI to Configure the Timing Client on page 138

Elements that You Can Configure in the CLI

To list the elements that you can configure using the CLI, type **enable** at the prompt and press Enter. Table 35 on page 128 list the configurable elements that appear.

Table 35: Configurable Elements in the CLI

Command	Description	Supported Users
backup tftp	Backs up the configuration file to a TFTP server.	Admin

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
backup scp	Backs up the configuration file (**config.dat**) in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	Admin
clear alarm	Clears the alarm.	• Admin • Read/Write
clear authlog	Clears authorization log.	Admin
clear daemon log	Clears daemon log.	Admin
clear eventlog	Clears event log.	Admin
clear ptp-stat	Clears the PTP statistics.	• Admin • Read/Write
clear syslog	Clears system log.	Admin
config 1/5/10MHz	Selects between 1 MHz, 5 MHz, and 10 MHz output on the 1/5/10 MHz port.	• Admin • Read/Write
config accounting	Enables or disables RADIUS accounting in the Timing Client.	• Admin • Read/Write
config accounting-level	Configures the information to be used by the Timing Client for accounting. The values are: • 1—For login accounting only • 2—For interactive and login accounting • 3—For configuration, interactive and login accounting	• Admin • Read/Write
config accounting-server add	Adds the IP address of the RADIUS accounting server and sets other related configurations (secret word, retries, timeout, and port) to be used by the Timing Client for accounting.	• Admin • Read/Write
config accounting-server del	Deletes the RADIUS accounting server and its configuration from the accounting server list by using the IP address of the accounting server.	• Admin • Read/Write
config alarm-email-receiver	Configures recipients of alarm e-mail notifications.	• Admin • Read/Write
config alarm-profile	Configures the alarm profile.	Admin

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config antenna-cable-delay-compensation	Configures a delay compensation value in the range of -10000 through 10000 nanoseconds to compensate antenna cable delay. NOTE: You are advised to enter: • A negative delay compensation value to compensate the positive delay introduced by the cable. • A positive delay compensation value to advance the PPS output delay relative to the absolute value.	• Admin • Read/Write
config antenna-voltage	Configures the input voltage for the antenna as 3.3V or 5V.	• Admin • Read/Write
config auth-order	Configures the authentication order to be followed by the Timing Client while authenticating an user. The following combination of authentication order is allowed: • RADIUS server authentication and then local authentication • Local authentication and then RADIUS server authentication • Only RADIUS server authentication • Only local authentication	• Admin • Read/Write
config change-password	Modifies your current login password.	Read/Write
config cli-banner-file	Downloads the specified text file from the mentioned path of the configured Secure Copy Protocol (SCP) server to the **/etc/config/cli_banner.txt** path for customizing the CLI banner. The downloaded file should be a plain text file. On rebooting, the TCA system checks for the **cli_banner.txt** file and displays the content in the file as CLI banner. NOTE: • The file cannot be downloaded from TFTP and FTP servers. • The TCA system supports only 1024 characters (including spaces and new line characters) for the downloaded file, so the TCA system would truncate any extra characters in the file. • The TCA system detects all special characters in the downloaded file as normal strings. • The TCA system displays the default hard coded CLI banner, if no customized CLI banner is configured. • The TCA system displays an empty banner, if the **cli_banner.txt** file is empty.	Admin

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config cli-banner-text	Configures a customized CLI banner. The CLI banner text that you have provided in this command is stored in the **cli_banner.txt** file in the **/etc/config** path. On rebooting, the TCA system checks for the **cli_banner.txt** file and displays the content in the file as CLI banner. The maximum length of the CLI banner text that you can enter in this command is 100 characters, which include spaces and special characters. You can also use special characters (such as \n. \v, \t, and so on) to format the CLI banner text provided in this command. NOTE: • If the **cli_banner.txt** file is available and already contains any content, then the existing content is replaced with the provided content. • You should avoid using the following special characters in the CLI banner text: |, “, and ‘. • The TCA system displays the default hard coded CLI banner, if no customized CLI banner is configured. • The TCA system displays an empty banner, if the **cli_banner.txt** file is empty.	Admin
config cli-timeout	Configures the session in-action session timeout.	• Admin • Read/Write
config datetime	Configures date and time for the Timing Client.	• Admin • Read/Write
config dns0	Configures the primary DNS server IP.	• Admin • Read/Write
config dns1	Configures the second DNS server IP.	• Admin • Read/Write
config domain	Configures the domain. {domain name}	• Admin • Read/Write
config dst	Configures offset, starting date and time, and ending date and time for DST.	• Admin • Read/Write
config e1 output loopback	Configures the E1 input port’s number of ports, mode, framing, encoding, Receive Sensitivity, SSM, and state.	• Admin • Read/Write
config e1 output port	Configures the E1 output port’s number of ports, mode, framing, encoding, LBO, SSM, and state.	• Admin • Read/Write
config enable-password	Modifies the password of the enable mode.	Admin

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config eth0 auto-nego	Turns Auto Negotiation ON or OFF for Ethernet 0 (LAN1) port.	• Admin • Read/Write
config eth0 duplex	Selects the duplex mode for the Ethernet 0 (LAN1) port between half or full duplex.	• Admin • Read/Write
config eth0 ip	Configures IP settings for Ethernet 0 (LAN1) port : IP address, mask, and gateway.	• Admin • Read/Write
config eth0 ip-mode	Selects the IP mode for the Ethernet 0 (LAN1) port between Static and DHCP.	• Admin • Read/Write
config eth0 speed	Selects the speed for the Ethernet 0 (LAN1) port between 10 and 100 Mbps.	• Admin • Read/Write
config gps anti-jamming	Enables or disables the anti-jamming capability for the Resolution SMT GPS Timing Receiver. NOTE: This command is available only if the TCA6500 Timing Client uses the Resolution SMT GPS Timing Receiver.	• Admin • Read/Write
config holdover-state	Configures the TCA system to remain in the holdover state or change to the internal state after 24 hours of holdover state. • 1—The system remains in the holdover state instead of changing to the internal state after 24 hours of holdover state. However, the system changes to the internal state when the signal is lost during acquisition, locking, or resetting the system. • 0 (default)—The system changes to the internal state after 24 hours of holdover state.	• Admin • Read/Write
config hostname	Configures the hostname. {hostname}	Admin
config language	Configures the webpages language.	• Admin • Read/Write
config password	Modifies your current login password.	Admin
config pps-squelch	Turns on or off the PPS squelch. • On—The PPS squelch is turned on, thereby disabling the PPS output when the TCA system is not locked to GPS or PTP. • Off (default)—The PPS squelch is turned off, thereby enabling the PPS output even when the TCA system is not locked to GPS or PTP.	• Admin • Read/Write
config ppx	Configures PPx.	• Admin • Read/Write

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config primary-ptp-server	Configures the primary (PTP) proprietary packet based timing protocol.	• Admin • Read/Write
config ptp add server	Adds a PTP server.	• Admin • Read/Write
config ptp slave	Configures PTP slave.	• Admin • Read/Write
config ptp slv disable	Disables the PTP protocol.	• Admin • Read/Write
config ptp slv domain	Configures the PTP domain number to be part of the same Grandmasters domain.	• Admin • Read/Write
config ptp slv dscp	Configures the Differential Service (DiffServ) of the IP packet.	• Admin • Read/Write
config ptp slv enable	Enables the PTP protocol.	• Admin • Read/Write
config ptp slv profile	Configures the profile for unicast packet types for both sync and delay request / response PTP event messages.	• Admin • Read/Write
config ptp unicast acc-master add	Adds the IP address of the acceptable Grandmasters for the Timing Client, which is used for the Ethernet network packet IP protocol.	• Admin • Read/Write
config ptp unicast acc-master del	Deletes the IP address of the acceptable Grandmasters for the Timing Client, which is used for the Ethernet network packet IP protocol.	• Admin • Read/Write
config ptp unicast announce	Configures the announce message rate that the Timing Client requests from the Grandmaster.	• Admin • Read/Write
config ptp unicast delay	Configures the delay response message rate that the Timing Client requests from the Grandmaster.	• Admin • Read/Write
config ptp unicast duration	Configures the Timing Client expiration duration for sending signaling messages without receiving an acknowledgement from the Grandmaster.	• Admin • Read/Write
config ptp unicast signaling	Enables or disables the sending of the signaling messages to the Grandmaster. • enable—Enables the sending of the signaling messages to the Grandmaster. • disable—Disables the sending of the signaling messages to the Grandmaster.	• Admin • Read/Write

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config ptp unicast sync	Configures the sync message rate that the Timing Client requests from the Grandmaster.	• Admin • Read/Write
config radius-server add	Adds the IP address of the RADIUS authentication server and sets other related configurations (secret word, retries, timeout, and port) to be used by the Timing Client for user authentication.	• Admin • Read/Write
config radius-server del	Deletes the RADIUS authentication server and its configuration from the authentication server list by using the IP address of the authentication server.	• Admin • Read/Write
config secondary-ptp-server	Configures the secondary (PTP) proprietary packet based timing protocol.	• Admin • Read/Write
config snmp contact	Configures the SNMP contact.	• Admin • Read/Write
config snmp readonly-community	Configures the SNMP read only community.	• Admin • Read/Write
config snmp readwrite-community	Configures the SNMP read and write community.	• Admin • Read/Write
config snmp-trap add	Adds a trap receiver address to the list.	• Admin • Read/Write
config snmp-trap del	Deletes a trap receiver from the list.	• Admin • Read/Write
config snmp-v3user add	Adds a SNMPv3 user.	• Admin • Read/Write
config snmp-v3user del	Deletes a SNMPv3 user.	• Admin • Read/Write
config snr	Selects SNR units between AMU or dBHz. NOTE: This command is not available if the TCA6500 Timing Client uses the Resolution SMT GPS Timing Receiver. The AMU is not an industry standard unit of measurement.	• Admin • Read/Write

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config ssl-key	Downloads the specified SSL key file from the mentioned path of the configured SCP server. For more information about the dynamic SSL certificate support, see "Dynamic SSL Certificate Overview" on page 21. NOTE: • The file cannot be downloaded from TFTP and FTP servers. • You must download the corresponding certificate file. • The file path and username should not contain any space characters.	Admin
config ssl-cert	Downloads the specified SSL certificate file from the mentioned path of the configured SCP server. For more information about the dynamic SSL certificate support, see "Dynamic SSL Certificate Overview" on page 21. NOTE: • The file cannot be downloaded from TFTP and FTP servers. • You must download the corresponding key file. • The file path and username should not contain any space characters.	Admin
config sync-src-priority	Configures the highest priority Sync Source that the Timing Client should use. Choices include: GPS, E1, PTP, or Internal.	• Admin • Read/Write
config timezone	Configures the time zone information.	• Admin • Read/Write
config unsecured-communication-protocols	Enables or disables unsecured transfer or communication protocols such as ICMP, TFTP, FTP, and Telnet protocol. The values are: • **1**—Specifies the ICMP. • **2**—Specifies the TFTP. • **3**— Specifies the FTP. • **4**—Specifies the Telnet protocol. • **5**—Specifies all the preceding protocols. By default, all the unsecured transfer or communication protocols are enabled.	• Admin
config user add	Creates a new user account with login class as Read-Only or Read/Write.	Admin
config user class	Modifies the login class for the Read-Only or Read/Write user account.	Admin
config user del	Deletes the Read-Only or Read/Write user account.	Admin

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
config user password	Creates a new password for the Read-Only or Read/Write user account.	Admin
config web	Configures the web enable/disable.	• Admin • Read/Write
config web-mode	Configures the web mode.	Admin
config web-timeout	Configures the web-timeout. [min]	Admin
ftp	Installs the specified software image from the configured FTP server.	Admin
halt	Halts the system.	• Admin • Read/Write
ping	Pings the remote host.	• Admin • Read/Write
reboot	Reboots the system.	• Admin • Read/Write
reset config	Restores the TCA6500 Timing Client to the manufacturer default configuration.	Admin
reset password	Restores the default password value.	Admin
restart timeprobe-agent	Starts or enables the time probe agent.	• Admin • Read/Write
restart ptp	Starts PTP operations	Admin
restore tftp	Restores the configuration file from a TFTP server.	Admin
restore scp	Restores the configuration file from the mentioned path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	Admin
save tftp authlog	Saves the author log to a TFTP server.	• Admin • Read/Write
save tftp daemonlog	Saves the daemon log to a TFTP server.	• Admin • Read/Write

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
save tftp eventlog	Saves the event log to a TFTP server.	• Admin • Read/Write
save tftp syslog	Saves the system log to a TFTP server.	• Admin • Read/Write
save scp authlog	Saves the author log in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
save scp daemonlog	Saves the daemon log in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
save scp eventlog	Saves the event log in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
save scp syslog	Saves the system log in the specified path of the SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	• Admin • Read/Write
tftp	Installs a software upgrade image file by TFTP.	Admin
tftp license	Upload TFTP license for value-added features.	• Admin • Read/Write

Table 35: Configurable Elements in the CLI *(continued)*

Command	Description	Supported Users
scp	Installs the specified software image from the mentioned path of the configured SCP server. NOTE: • The file path and username should not contain any space characters. • The maximum length of the CLI command should not exceed 124 characters.	Admin

Using the CLI to Configure the Timing Client

To use the CLI to configure the Timing Client:

1. Launch a CLI session as described in "Accessing the Timing Client Using the CLI" on page 121.
2. At the prompt, type **enable** and press Enter.
3. At the password prompt, type **enable** and press Enter.
4. At the prompt, enter the configuration command for the element to be changed or configured.
5. At the element prompt, enter the value to be used to replace the current value shown in the brackets < > and press Enter or just press Enter to retain the current value.
6. When changing the elements have been completed, enter exit and press Enter to save your changes and return to exit the enable condition.

Accessing the Timing Client Using SSH

To access the Timing Client using SSH:

1. Using a computer connected on the same network segment as the Timing Client, run the SSH client software (such as the free-ware "PuTTY" or TuTTY").
2. Enter the IP address of the Timing Client in the hostview window.

NOTE: If the Timing Client is being accessed for the first time, see "Assigning an IP Address to the TCA6000 or TCA6500 Timing Client" on page 13 for information about connecting to the unit and accessing the user interface.

3. Click the **OK** button. A DOS window appears.
4. At the login prompt, type the login name chosen and press Enter.
5. At the User name prompt, type the username and press Enter.
6. At the Password prompt, type the corresponding password and press Enter.

To see a list of available commands, type help.

Refer to Table 34 on page 124 for a list of viewing options and Table 35 on page 128 for a list of configurable elements.

APPENDIX B

Using the CLI to Configure PTP and Network Interface Parameters

The TCA6000 and TCA6500 Timing Clients are equivalent with respect to these features. The TCA6500 Timing Client has the additional function of having an integrated GPS receiver. Reference to the TCA6000 Timing Client applies also for the TCA6500 Timing Client. This document addresses the configuration for the PTP functionality in order to communicate with the TCA8000 Timing Server or third-party Grandmaster. Since the Ethernet physical layer and packet protocol (UDP/IP) are part of the connectivity this is also covered in the document even though this is a general requirement in order to access also the management interface of the system. Similarly this applies to the VLAN which is optional. All configuration commands are preceded by config and status commands preceded by show, except where noted with an asterisk (*).

Timing Client PTP Functions

The TCA6000 and TCA6500 Timing Clients are equivalent with respect to these features. The TCA6500 Timing Client has the additional function of having an integrated GPS receiver. Reference to the TCA6000 Timing Client applies also for the TCA6500 Timing Client.

PTP Profile Types

Default Profile:

- Supports OneStep and TwoStep modes.
- Process Multicast Announce/Sync/Delay Response.

- Sends Multicast Delay Request with 32 pps or 64 pps.
- There is no Signaling/Management Packet support.

Brilliant Profile:

- Supports OneStep and TwoStep modes.
- Process Multicast Announce/Sync and Unicast Delay Response.
- Sends Unicast Delay Request with 32 pps or 64 pps.
- There is no Signaling/Management Packet support.

Telecom Profile without Signaling:

- Supports OneStep mode only.
- Supports Unicast Announce/Sync and Unicast Delay Response.
- There is no Signaling/Management Packet support.

  Entry of the Slave IP address is configured at the Grandmaster (TCA8000 Timing Server).

Telecom Profile with Signaling:

- Supports OneStep mode only.
- Supports Unicast Announce/Sync and Unicast Delay Response.
- Supports Unicast Discovery and Signaling.
- Slave supports signaling messages for:

  Sends REQUEST UNICAST TRANSMISSION for Announce

  Sends REQUEST UNICAST TRANSMISSION for SYNC

  Sends REQUEST UNICAST TRANSMISSION for Delay Response

  Process GRANT UNICAST TRANSMISSION for Announce

  Process GRANT UNICAST TRANSMISSION for SYNC

  Process GRANT UNICAST TRANSMISSION for Delay Response

  Sends CANCEL UNICAST TRANSMISSION for Delay Response

  Acceptable Master Support. Maximum Acceptable Masters is 2

  Sync Rate can be configured from 1 pps to 64 pps

NOTE: 32 pps or 64 pps (recommended) required for meeting performance specifications.

Delay Rate can be configured from 1 pps to 64 pps

NOTE: 32 pps or 64 pps (recommended) required for meeting performance specifications.

Announce Rate can be configured from 1 packet per second to 1 packet per 8 seconds.

PTP Profile Configuration

Configuration requires the second level of login which is after login using admin / admin (or user assigned information) the config login needs to be executed which is “en” at the prompt followed by entering the password “enable”.

The network parameters of the Ethernet interface should be configured before configuring the PTP profile information.

The following parameters are set for the PTP profile through the configuration commands:

Table 36: Configuration Commands

Parameter	Value
Domain number	0 to 254
Delay Req Mode	0:Unicast 1:Multicast
Telecom Profile	0: Telecom Profile Disable 1: Telecom Profile Enable
Delay Req Interval	5: 32 pps 6: 64 pps
Announce Receipt Timeout	2 to 10

The parameter options for the configuration command can be obtained for the configuration commands by adding a question-mark (?) after typing in # config, such as "# config ptp slave?"

NOTE: Configuration for Default, Brilliant/Juniper and Telecom with or without Signaling profiles can also be done through the Web Interface.

- Default Profile Configuration Command on page 144
- Brilliant/Juniper Profile Configuration Command on page 145
- Telecom Profile—Without Signaling Configuration Command on page 145

Default Profile Configuration Command

The profile is configured with other PTP parameters within a configuration string. The Sync and Delay_Response rates at the Grandmaster are required to match the Timing Client Sync and Delay_Request packet rates.

ptp slave:

The parameters that are required to be configured are the PTP Domain # (0-254), the Sync / Delay_Request packet type as being multicast, the profile type as not being Telecom Profile, the Delay_Request packet rate and the Announce message type response from the Grandmaster timeout interval.

ptp slv—[domain #=20] [Default Profile = 1 0 (multicast) & (Telecom Profile disabled)] [Delay Req Interval = 6] [Announce Receipt Timeout=10]

NOTE: **Only Delay Req Interval rates of 32 pps or 64 pps are supported and 64 (6) is recommended.**

```
# config ptp slave 20 1 1 6 10
```

ptp slv dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp slv dscp 46
```

config ptp slv disable—Disables the PTP protocol. Only after your confirmation, the PTP protocol is disabled.

NOTE: **This command is applicable for all profile types.**

```
# config ptp slv disable
Are you sure you want to disable slave ptp? y/n
y
```

config ptp slv enable—Enables the PTP protocol. Only after your confirmation, the PTP protocol is enabled.

NOTE: **This command is applicable for all profile types.**

```
# config ptp slv enable
Are you sure you want to enable slave ptp? y/n
y
```

Brilliant/Juniper Profile Configuration Command

The profile is configured with other PTP parameters within a configuration string. The Sync and Delay Response rates at the Grandmaster are required to match the Timing Client Sync and Delay_Request packet rates.

ptp slave:

- The parameters that are required to be configured are the PTP Domain # (0-254), the Sync / Delay_Request packet type as being unicast, the profile type as not being Telecom Profile, the Delay_Request packet rate and the Announce message type response from the Grandmaster timeout interval.

Example configuration:

config ptp slave 20 0 1 6 10

- [domain #=20] [Default Profile = 0 1 (unicast) & (Telecom Profile disabled)] [Delay Req Interval = 6] [Announce Receipt Timeout=10]

NOTE: Only Delay Req Interval rates of 32 pps or 64 pps are supported and 64 (6) is recommended.

ptp slv dscp:

- Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

  Example: # config ptp slv dscp 46

Telecom Profile—Without Signaling Configuration Command

The profile is configured with other PTP parameters within a configuration string. In order for the Grandmaster to recognize the slave unit, the Timing Client IP address of the Timing Client needs to be configured at the Grandmaster for the Ethernet network IP protocol communication link. The Sync and Delay_Response rates at the Grandmaster are required to match the Timing Client Sync and Delay_Request packet rates.

ptp slave—The parameters that are required to be configured are the PTP Domain # (0-254), the Sync / Delay_Request packet type as being unicast, the profile type as Telecom Profile, the Delay_Request packet rate and the Announce message type response from the Grandmaster timeout interval.

```
# config ptp slave 20 0 0 6 10
[domain #=20] [Default Profile = 0 0 (unicast) & (Telecom Profile enabled)] [Delay
 Req Interval = 6] [Announce Receipt Timeout=10].
```

NOTE: The TCA6000 supports Delay Req Interval rates of 32 pps or 64 pps are supported and 64 pps (6) is recommended.

ptp slv dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp slv dscp 46
```

Telecom Profile—With Signaling Configuration Command

The profile requires individual parameters to be entered. Even though some parameters are not directly associated with the profile, these parameters will be shown here for consistency with the other profile configuration string.

ptp slv domain—Configures the PTP domain number to be part of the same Grandmaster(s) domain. The values can be 0 to 254 and needs to be configured as the same domain number of the associated Grandmaster(s).

```
# config ptp slv domain 20
```

ptp slv profile—Configure the profile for unicast packet types for both Sync and Delay_Request /Response PTP event messages.

```
# config ptp slv profile 2
```

ptp unicast sync—Configures the Sync message rate that the Timing Client requests from the Grandmaster.

NOTE: The TCA6000 Timing Client supports Sync rates of 32 pps or 64 pps are supported and 64 pps (6) is recommended.

```
# config ptp unicast sync 6
```

ptp unicast delay—Configures the Delay_Response message rate that the Timing Client requests from the Grandmaster.

NOTE: The TCA6000 Timing Client supports Delay_Request/Response rates of 32 pps or 64 pps are supported and 64 pps (6) is recommended.

```
# config ptp unicast delay 6
```

ptp unicast announce—Configures the Announce message rate of 1 packet per second to 1 packet per 8 seconds that the Timing Client requests from the Grandmaster.

```
# config ptp unicast announce 0
```

ptp unicast duration—Configures the Timing Client expire duration for sending signaling messages without receiving acknowledgement from the Grandmaster. The duration can be configured in 1 second increments from 100 to 3000.

```
# config ptp unicast duration 3000
```

ptp unicast acc-master add—Adds the IP-address of the acceptable Grandmaster(s) for the Timing Client which is used for the Ethernet network packet IP protocol.

```
# config ptp unicast acc-master add 192.168.50.101
```

ptp unicast acc-master del—Deletes the IP-address of the acceptable Grandmaster(s) for the Timing Client which is used for the Ethernet network packet IP protocol.

```
# config ptp unicast acc-master del 192.168.50.101
```

ptp unicast signaling—Enables or disables the signaling messages to be sent to the Grandmaster.

```
# config ptp unicast signaling enable
```

NOTE: When reverting back to other profiles, signaling needs to be disabled.

ptp slv dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp slv dscp 46
```

Status Commands

Most status commands can be executed at the first level of login except where noted by an asterisk (*). These commands require the second level of login which is the same level as when configuration commands are executed.

ptp config—Displays the configuration parameters of the PTP for the Default, Brilliant/Juniper or Telecom Profile without Signaling.

ptp unicast-config—Displays the configuration parameters of the PTP for Telecom Profile with Signaling.

ptp default-dataset—Displays the PTP parameter including Domain # that is configured.

ptp utc-prop—Displays the UTC time information that is being used within the PTP timestamps including the offset.

ptp timescale-prop—Displays the PTP timestamp source type.

ptp stat—* Displays the valid and invalid PTP message event counters.
clear ptp stat: *Clears the counters

ptp dscp—Displays the Differential Service value for the IP packets which transport the PTP event and signaling messages.

ptp status—Displays the operation mode of the Timing Client (slave), state and PTP domain number.

Sync Source Selection

The Sync (Synchronization) Source selection provides a priority selection for the TCA6000/6500 Timing Clients. The selected clock source is used to provide the clock reference for the external timing ports, that is T1/E1, 10/5/1 MHz and Pulse-per-Second (PPS). The TCA6000 Timing Client should be configured for “ptp”, that is the IEEE1588v2 recovered timing. The TCA6500 Timing Client has two source selections which are the “ptp” and the GPS recovered timing. Since GPS is a higher Stratum level than PTP recovered timing, it Is normally configured as the higher priority source.

- Configuration on page 148
- Status Commands on page 148

Configuration

sync-src-priority—Configures the priority selection for the timing source that is used with starting with the highest priority first in the string. Both products use the internal reference oscillator when a source is not available.

```
# config sync-src-priority gps ptp interna
```

NOTE:

- ‘Internal’ should always be the lowest priority.
- The ‘gps’ is only valid for the TCA6500 Timing Client.

Status Commands

sync-src-priority—Displays the Sync Source selections with highest priority being displayed first.

NOTE: If ‘internal’ was not specified the status will not display this selection although it is still in the sync source selection as the lowest priority.

Ethernet Port Network Configuration

The Ethernet port is required to be configured with the appropriate Ethernet and IP parameters.

NOTE: You cannot configure Ethernet and VLAN port addresses to be in the same subnet (that is, all logical and physical interfaces should be configured to be in different subnets).

Configuration

The reference to eth0 (LAN port) is for the single TCA6000 Timing Client Ethernet port.

eth0 speed—Configures the Ethernet port to either 10 or 100 Mbps. It is recommended to use 100 Mbps (default).

eth0 duplex—Configures the Ethernet port as half or full duplex. For performance requirements to be achieved, full duplex (default) is required.

eth0 auto-nego—Configures the Ethernet port as being able to auto negotiate the speed and half/full duplex (yes / no). It is recommended this be disabled (default), that is no.

eth0 ip—Configures the port IP address, IP Mask and Gateway.

```
config eth0 ip 192.168.50.120 255.255.255.0 192.168.50.1
```

eth0 ip-mode—Configures the IP address as being a static or dynamic.

```
# config eth0 ip-mode static
```

ptp slv dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp slv dscp 4
```

Status Commands

show network—Displays the network configuration and MAC address of the Ethernet port.

VLAN Port Association (optional)

VLAN port association is not required for the operation of IEEE1588v2 and is used only when it is required to encapsulate the IEEE1588v2 timing packets and signaling (if enabled) into a VLAN packet format. If the Ethernet switch in which the TCA6000 Timing Client is connected supports port based VLAN than this operation can be accomplished within the actual Ethernet switch. Two VLANs are supported for the single Ethernet port. When using VLANs the application would be that one VLAN is associated with PTP message events which are on the same VLAN as the PTP Grandmaster Ethernet port (LAN1). The second VLAN would be associated with the management system within the network. Following is the configuration commands to attach a VLAN to IEEE1588v2 (PTP) event messages. Configuration requires the second level of login which is after login using admin / admin (or user assigned information) the config login needs to be executed

which is “en” at the prompt followed by entering the password “enable”. The network parameters of the Ethernet interface should be configured before configuring the VLAN information.

NOTE: You cannot configure Ethernet and VLAN port addresses to be in the same subnet (that is, all logical and physical interfaces should be configured to be in different subnets).

- Configuration Commands on page 150
- Status Commands on page 151

Configuration Commands

The second VLAN is configured in a similar manner by using VLAN2 instead of VLAN1.

eth0 vlan1 ip—Configures the VLAN Ethernet IP address.

```
# config eth0 vlan1 ip 192.168.1.100 255.255.0.0
```

eth0 vlan1 id—Assigns a unique VLAN ID that is used for the VLAN encapsulation packet. This value can be in the range from 2 through 4095.

```
# config eth0 vlan1 id 100
```

NOTE: If the VLAN ID you have configured is already being used by any other VLAN, a warning message is displayed.

eth0 vlan1 priority—This assigns the 3 bit priority in the VLAN header which is used for differential services transporting the packet. It is recommended this be configured to the high priority level and use the value 7.

```
# config eth0 vlan1 priority 7
```

eth0 vlan1 ip-mode—Configures the IP address as being a static or dynamic.

```
# config eth0 vlan1 ip-mode static
```

ptp slv dscp—Configures the Differential Service (DiffServ) of the IP packet which transports the PTP event and signaling messages. This should be configured to Explicit Forward (EF) which is a value of 46 decimal.

```
# config ptp slv dscp 46
```

ptp slv interface—Configures the VLAN 1 or 2 configuration parameters to be used to encapsulate the PTP signaling and event messages.

```
# config ptp slv interface eth0 1
```

eth0 vlan1 enable—VLAN encapsulation of the IP packet is enabled.

```
# config eth0 vlan1 enable
```

NOTE: After VLAN related configuration restart PTP by using the command “# restart ptp”.

eth0 vlan1 disable—VLAN encapsulation of the IP packet is disabled.

```
# config eth0 vlan1 disable
```

NOTE: After VLAN related configuration restart PTP by using the command “# restart ptp”.

Status Commands

ptp interface—Displays if there is VLAN encapsulation enabled and if it is which VLAN1 and 2 encapsulation parameters are being used for the PTP event and signaling messages.

network—Displays the network IP and port parameters which includes the VLAN enable/disable information.

vlan—Show the VLAN parameters for VLAN 1 and 2.

APPENDIX C

Using the CLI to Configure User Authentication and RADIUS Accounting

This appendix explains the CLI commands used to configure user authentication and RADIUS accounting in the TCA6000 and TCA6500 Timing Clients. The TCA6000 and TCA6500 Timing Clients work the same in case of these features.

User Authentication

User authentication enables the user logging in to the Timing Client to be authenticated either locally, using RADIUS authentication servers, or both based on the authentication order.

Configuration Commands

radius-server add—Adds the IP address of the RADIUS authentication server to be used by the Timing Client for user authentication. While adding the IP address, you can set the optional parameters secret word, retries (1 to 10), timeout (1 to 90), and port, that is [secret-word] [retries] [timeout] [port].

NOTE: **The default values are set for the retries, timeout, and port options, if not configured. You can use the same command for modifying the configuration details of existing RADIUS authentication server. You can add only three RADIUS authentication servers.**

 # config radius-server add 192.168.0.2 auth123 5 50 1800 where [secret-word=auth123], [retries=5], [timeout=50 seconds], [port=1800]

radius-server del—Deletes the RADIUS authentication server and its configuration by using the IP address of the server. The server is no longer used by the Timing Client for user authentication.

#config radius-server del 192.168.0.2

auth-order—Configures the authentication order to be followed by the Timing Client.

#config auth-order radius [Only RADIUS server authentication]

Status Commands

radius-server—Displays the details of the configured RADIUS authentication servers.

auth-order—Displays the configured authentication order.

RADIUS Accounting

RADIUS accounting enables the Timing Client to remotely account users logged in to the Timing Client.

- Configuration Commands on page 154
- Status Commands on page 154

Configuration Commands

accounting-server add—Adds the IP address of the RADIUS accounting server to be used by the Timing Client for accounting. While adding the IP address, you can set the optional parameters secret word, retries (1 to 10), timeout (1 to 90), and port, that is [secret-word] [retries] [timeout] [port].

NOTE: **The default values are set for the retries, timeout, and port options, if not configured. You can use the same command for modifying the configuration details of existing RADIUS accounting server. You can add only 3 RADIUS accounting servers.**

 # config accounting-server add 192.169.0.2 auth123 5 50 1814 where [secret-word=auth123], [retries=5], [timeout=50 seconds], [port=1814]

accounting-server del—Deletes the RADIUS accounting server and its configuration by using the IP address of the server. The server is no longer used by the Timing Client for accounting.

#config accounting-server del 192.169.0.2

accounting-level—Configures the information (1: For login accounting only, 2: For interactive and login accounting, 3: For configuration, interactive and login accounting) to be used by the Timing Client for accounting. Default value is 3.

 # config accounting-level 1 where [1=For login accounting only]

accounting—Enables or disables RADIUS accounting in the Timing Client.

 # config accounting enable

Status Commands

accounting-server—Displays the details of the configured RADIUS accounting servers.

accounting-level—Displays the type of information to be accounted.

accounting-status—Displays the current status of RADIUS accounting.

APPENDIX D

Specifications

This appendix lists the specifications for the Juniper Networks TCA6000 and TCA6500 Timing Clients.

Physical Dimensions

Table 37 on page 157 lists the physical dimensions of the TCA6000 and TCA6500 Timing Clients.

Table 37: Physical Dimensions

Dimension	Specification
Height	1.75 in (4.45 cm)
Width	8.5 in (21.59 cm)
Depth	12 in (30.48 cm)

Power Specifications

Table 38 on page 157 lists the power specifications for the TCA6000 and TCA6500 Timing Clients.

Table 38: Power Specifications

Dimension	Specification
Power Consumption	Max 15 W
Input Voltage	DC version: –18 to –60 VDC

Environmental Specifications

Table 39 on page 158 lists the environmental specifications for the TCA6000 and TCA6500 Timing Clients.

Table 39: Environmental Specifications

Dimension	Specification
Operating Temperature	+ 40º F to +144º F (-40º C to + 65º C)
Storage Temperature	-104º F to +176º F (-40º C to +80º C)
Operating Humidity	0% to 85% non-condensing,

APPENDIX E

Agency Compliance

Agency Compliance

The Juniper Networks TCA6000 and TCA6500 Timing Clients are "Suitable for deployment" in any environment where the following compliance certifications are accepted:

- EMC testing to:
  - ETSI EN301-489-1
  - ETSI EN301-444
  - EN 300-386 and reports FCC, ICES 003, EN55022, AS/NZS CISPR22, VCCI
  - EN 301-489-1 and EN301-444 (Spurious Rad emissions above 1 GHz on the GPS version)
- Safety testing to:
  - IEC 60950-1, EN 60950-1+A11
  - UL/CSA 60950-1 and certification by TUV for TUV T-mark (European)
  - cTUVus—mark (North America) and CB test report, CB certificate (worldwide)

APPENDIX F

Cable Specification

Console Cable Specification

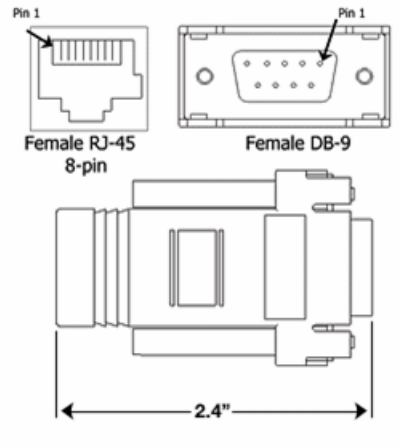
To communicate with a Juniper Networks TCA6000 or TCA6500 Timing Client, a standard RJ-45 to DB-9 cable is used.

Table 40: Signal Flow Diagram

From RJ-45	Signal	Direction	Signal	To DB-9
1	RTS (not connected)	→	CTS	8
2	DTR / TXD Time-of-Day* (not connected)	→	DTS / TXTOD*	6
3	TXD	→	RXD	2
4	GND	↔	GND	5
5	GND	↔	GND	5
6	RXD	←	TXD	3
7	DSR (not connected)	←	DTR	4
8	CTS (not connected)	←	RTS	7

* Available only for TCA6500.

Figure 47: Console Cable Connectors



APPENDIX G

Warranty and Support

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the JTAC User Guide located at http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit http://www.juniper.net/support/warranty/.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/
- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/

- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

Returning a Hardware Component to Juniper Networks, Inc.

If a problem cannot be resolved by the JTAC technician, a Return Materials Authorization (RMA) is issued. This number is used to track the returned material at the factory and to return repaired or new components to the customer as needed.

NOTE: Do not return any component to Juniper Networks, Inc. unless you have first obtained an RMA number. Juniper Networks, Inc. reserves the right to refuse shipments that do not have an RMA. Refused shipments will be returned to the customer through collect freight.

For more information about return and repair policies, see the customer support webpage at http://www.juniper.net/support/guidelines.html.

For product problems or technical support issues, contact the Juniper Networks Technical Assistance Center (JTAC) using the Case Manager link at http://www.juniper.net/support/ or at 1-888-314-JTAC (within the United States) or 1-408-745-9500 (from outside the United States).

To return a hardware component:

1. Determine the part number and serial number of the component.
2. Obtain an RMA number from the Juniper Networks Technical Assistance Center (JTAC). You can send e-mail or telephone as described above.
3. Provide the following information in your e-mail message or during the telephone call:
   - Part number and serial number of component
   - Your name, organization name, telephone number, and fax number
   - Description of the failure
4. The support representative validates your request and issues an RMA number for return of the component.
5. Pack the component for shipment.

PART 7

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